

## PATENT ABSTRACTS OF JAPAN

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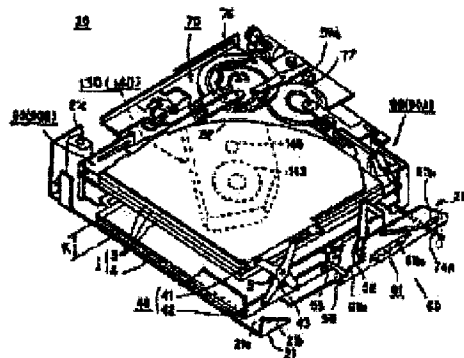
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## (54) DISK AUTOMATIC PLAYING DEVICE

## (57)Abstract:

PURPOSE: To place a disk playing section within a prescribed space by using a disk housing magazine in which plural trays mounted with disks are densely laminated, inserting the magazine into the automatic disk playing device, selecting and separating the desired tray at a prescribed placing position.

CONSTITUTION: In a magazine 1, plural trays 3, in which disks 2 are mounted, are densely laminated on a tray placing table 4 and are framed portably. Moreover, following the insertion of the magazine 1 into a device 20, the magazine 1 is framed so that the magazine 1 can separate the tray. At a prescribed position, a desired tray is selected by a tray selection and separating mechanism section 90 and the desired tray 3 is separated in the tray laminating direction so that a prescribed space K is kept between the desired tray 3 and a tray 3 adjacent to the desired tray 3 or the tray placing table 4. Thus, a disk playing section 140 is placed within the prescribed space K.



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**CLAIMS**

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[Claim(s)]

[Claim 1]Equip a tray characterized by comprising the following with a disk, carry out the plural laminates of this tray to a tray mounting table densely, and. A disk storage magazine which carried out framework formation is used for a state which can carry two or more these trays and these tray mounting tables, A disk automatic playing device which performs this disk that laid this disk storage magazine in a device, and chose and separated a desired tray from this disk storage magazine after that and, with which a tray of this request was equipped.

it being fixed to a frame used as a pedestal of said device, and following on insertion operation of said disk storage magazine -- a tray from a framework state which can carry this disk storage magazine -- a magazine placement mechanism part whose maintenance of a tray separation state changed into a disengageable framework state and was enabled.

Are provided between said frame and said magazine placement mechanism part, and a sliding plate which has the stair-like cam which carried out connection formation gradually is automatically formed in a tray laminating direction movable, corresponding with tray laminating order, A sliding mechanism section which said magazine is moved to a predetermined mounting position of these magazine placement mechanism circles, engaging with this sliding plate, and moves only this sliding plate further according to selection operation of a desired tray.

Hold a cam wheel connected with a driving source, and it is installed in the outside of a mounting position of said disk storage magazine, And a cam wheel supporter which is supported engaging with a stair-like cam formed in said sliding plate, collaborates with movement of this sliding plate at the time of selection operation, and moves to a tray

laminating direction gradually via this stair-like cam.

It is provided enabling a free attitude so that it may be supported by said cam wheel supporter, and it may collaborate with movement of said sliding plate at the time of selection operation, and/or rotation of said cam wheel and insertion of said disk storage magazine may be permitted, Choose a desired tray from said tray laminated densely, and in a mounting position And a tray of this request, A tray of this request is divided into a tray laminating direction so that a predetermined interval may be maintained between a tray which adjoins a tray of this request, or said tray mounting table, And only said disk is laid in a turntable from a tray of this separated request, And tray selection and a separation mechanism section with a lifter part to which a desired tray in which this disk was removed is evacuated near [ turntable ] this while maintaining an interval predetermined [ this ], It is provided enabling a free attitude so that it may be supported by said cam wheel supporter, and it may collaborate with rotation of said cam wheel and insertion of said disk storage magazine may be permitted, A disk performance mechanism part which makes a disk playing section holding said turntable which performs said disk, an optical pickup, etc. face in an interval predetermined [ this ] corresponding to this cam wheel supporter and one gradually.

[Claim 2]In the Claim 1 description, grasp said disk on said tray by a disk grasping lever, and equip it, carry out the plural laminates of this tray to a tray mounting table densely, and. A disk storage magazine which carried out framework formation is used for a state which can carry two or more these trays and these tray mounting tables, It provides enabling a free attitude so that it may collaborate with rotation of this cam wheel in said tray selection and a separation mechanism section and insertion of said disk storage magazine may be permitted, And add a disk grasping release part which carries out grasping release of this disk grasped on a tray of this request, and. A spindle part with [ fit into a turntable in said disk playing section with a central hole of said disk, and ] a chucking claw, When a placing part which lays this disk is formed and only said ISUKU is laid in said turntable from a tray of said separated request, A disk automatic playing device constituting so that grasping release of this disk grasped on a tray of this request may be carried out via this disk grasping release part and this disk may be removed from this tray, after chucking of this disk is carried out to this turntable via this chucking claw.

[Claim 3]The Claim 1 description and the Claim 2 description characterized by comprising the following.

A switch which detects laminating order of said tray to said frame.

An arm removable on this switch.

[Claim 4]In the Claim 1 description, the Claim 2 description, and the Claim 3 description, said magazine placement mechanism part and said sliding mechanism section are assembled as one unit as a wearing system of said disk storage magazine, As a performance system which performs said disk which chose and separated a tray of said request and, with which a tray of this request was equipped, said tray selection and a separation mechanism section, A disk automatic playing device having assembled said cam wheel supporter which supported said disk performance mechanism part to one as one unit, and installing both units in said frame.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application]The disk storage magazine which laminated densely two or more trays equipped with a disk is used for this invention, This disk storage magazine is inserted into a device, a desired tray is chosen and separated in a predetermined mounting position, and it is related with the disk automatic playing device constituted so that the disk with which the desired tray was equipped could be performed automatically.

[0002]

[Description of the Prior Art]Recent years, a compact disk (CD), a ROM type compact disk (CD-ROM), It is well-known for disc-like disks (optical disc), such as a interactive compact disc (CD-I) and a video disk (VD), to have changed information signals, such as speech information, picture information, and text, into two or more minute pit sequences, and to have recorded so much.

[0003]And since it is promptly renewable from the position of a request of information signals, such as speech information, picture information, and text, if a user equips a disk playing device with the above-mentioned disk and plays a playback side (or recording surface) by an optical pickup (or record) (or record), the user appreciates very much.

[0004]Among the above-mentioned disk playing devices, the disk storage magazine which stored the disk of two or more sheets is used, This disk storage magazine is inserted in the magazine placing part in a disk automatic playing device, among these there is a thing as shown in drawing 25 as a conventional disk automatic playing device

constituted so that a desired disk might be pulled out selectively and the automatic performance of it could be carried out to a disk playing section.

[0005]As for the disk storage magazine 200 (it is hereafter described as the magazine 200), appearance shape is formed in the box in drawing 25. In the magazine 200, the tray 201 is guided in a guide groove on either side at 200b and 200b, and can detach from the opening 200a and attach freely.

And for every group, the tray 201 which laid the disk 202 opens a predetermined interval, and is laminated, respectively.

This magazine 200 is inserted in an arrow direction from the loading slot 210a of the disk automatic playing device 210, and it lays in the magazine placing part 210b. And the tray 201 which laid the desired disk 202 by the tray drawer means (not shown) is pulled out to the upper part of the disk playing section 210c. Then, 1 set of trays 201 pulled out to the upper part of the turntable 211 established in the disk playing section 210c, It descends in the direction of a turntable by a tray vertical movement means (not shown), only the disk 202 is laid on the turntable 211, the tray 201 is evacuated under the turntable, and the disk 202 is performed by the optical pickup 212.

[0006]

[Problem(s) to be Solved by the Invention]By the way, in the conventional disk automatic playing device 210. Pull out selectively the tray 201 which laid the desired disk 202 in the magazine placing part 210b for the magazine 200 after installation to the disk playing section 210c, and only the disk 202 is laid on the turntable 211, Although the automatic performance of the disk 202 can be carried out by the optical pickup 212, the magazine placing part 210b which lays the magazine 200, and the disk playing section 210c which performs the disk 202 are set as an adjoining different place in the device 210.

[0007]That is, the installed position of the disk playing section 210c is installed in the position which pulled out the tray 201 thoroughly from the magazine 200, and needs an area almost equal to the area which the magazine placing part 210b occupies. Therefore, even if it sets the outside dimension of the magazine 200 as the size which may be sufficient for the ability of the disk 202 to be stored, The occupation area of the magazine 200 is [ more than double ] needed at least, and the occupation area by the side of the device 210 has a problem which cannot attain easily the miniaturization of the disk automatic playing device 210 which adopted the magazine 200 of this kind of structure gestalt.

[0008]The magazine 200 is formed in the box, since it shows around in the guide grooves 200b and 200b, a predetermined interval is opened and it laminates so that it may pull

out and be easy to carry out the internal tray 201, the height measurement of the magazine 200 becomes high and the portable performance is falling.

[0009]Then, a disk automatic playing device which can set up small the occupation area by the side of the device 210 is desired using the magazine of a structure gestalt with sufficient portable performance.

[0010]

[Means for Solving the Problem]This invention is made in view of an aforementioned problem which is characterized by that a disk automatic playing device comprises the following, and the 1st invention, Equip a tray with a disk, carry out the plural laminates of this tray to a tray mounting table densely, and. A disk storage magazine which carried out framework formation is used for a state which can carry two or more these trays and these tray mounting tables, A disk automatic playing device which performs this disk that laid this disk storage magazine in a device, and chose and separated a desired tray from this disk storage magazine after that and, with which a tray of this request was equipped.

it being fixed to a frame used as a pedestal of said device, and following on insertion operation of said disk storage magazine -- a tray from a framework state which can carry this disk storage magazine -- a magazine placement mechanism part whose maintenance of a tray separation state changed into a disengageable framework state and was enabled.

Are provided between said frame and said magazine placement mechanism part, and a sliding plate which has the stair-like cam which carried out connection formation gradually is automatically formed in a tray laminating direction movable, corresponding with tray laminating order, A sliding mechanism section which said magazine is moved to a predetermined mounting position of these magazine placement mechanism circles, engaging with this sliding plate, and moves only this sliding plate further according to selection operation of a desired tray.

Hold a cam wheel connected with a driving source, and it is installed in the outside of a mounting position of said disk storage magazine, And a cam wheel supporter which is supported engaging with a stair-like cam formed in said sliding plate, collaborates with movement of this sliding plate at the time of selection operation, and moves to a tray laminating direction gradually via this stair-like cam.

It is provided enabling a free attitude so that it may be supported by said cam wheel supporter, and it may collaborate with movement of said sliding plate at the time of selection operation, and/or rotation of said cam wheel and insertion of said disk storage magazine may be permitted, Choose a desired tray from said tray laminated densely,

and in a mounting position And a tray of this request, A tray of this request is divided into a tray laminating direction so that a predetermined interval may be maintained between a tray which adjoins a tray of this request, or said tray mounting table, And only said disk is laid in a turntable from a tray of this separated request, And tray selection and a separation mechanism section with a lifter part to which a desired tray in which this disk was removed is evacuated near [ turntable ] this while maintaining an interval predetermined [ this ], It is provided enabling a free attitude so that it may be supported by said cam wheel supporter, and it may collaborate with rotation of said cam wheel and insertion of said disk storage magazine may be permitted, A disk performance mechanism part which makes a disk playing section holding said turntable which performs said disk, an optical pickup, etc. face in an interval predetermined [ this ] corresponding to this cam wheel supporter and one gradually.

[0011]In the Claim 1 description, the 2nd invention grasps said disk on said tray by a disk grasping lever, and equips it, carry out the plural laminates of this tray to a tray mounting table densely, and. A disk storage magazine which carried out framework formation is used for a state which can carry two or more these trays and these tray mounting tables, It provides enabling a free attitude so that it may collaborate with rotation of this cam wheel in said tray selection and a separation mechanism section and insertion of said disk storage magazine may be permitted, And add a disk grasping release part which carries out grasping release of this disk grasped on a tray of this request, and. A spindle part with [ fit into a turntable in said disk playing section with a central hole of said disk, and ] a chucking claw, When a placing part which lays this disk is formed and only said ISUKU is laid in said turntable from a tray of said separated request, After chucking of this disk is carried out to this turntable via this chucking claw, it is a disk automatic playing device constituting so that grasping release of this disk grasped on a tray of this request may be carried out via this disk grasping release part and this disk may be removed from this tray.

[0012]The 3rd invention provides a switch which detects laminating order of said tray to said frame, and an arm removable on this switch in the Claim 1 description and the Claim 2 description, and. Two or more connection formation of the Yamagata-like cam corresponding to said sliding plate with tray laminating order is carried out, Whenever it makes an end part of this arm come to engage with this mountain shape cam and an end part of this lever passes a mountain of this mountain shape cam by movement of this sliding plate at the time of desired tray selection, carry out the coefficient of the tray laminating order via this switch, and. It is a disk automatic playing device

constituting so that this sliding plate may be moved to said desired stair-like cam positions.

[0013]In the Claim 1 description, the Claim 2 description, and the Claim 3 description the 4th invention, Said magazine placement mechanism part and said sliding mechanism section are assembled as one unit as a wearing system of said disk storage magazine, As a performance system which performs said disk which chose and separated a tray of said request and, with which a tray of this request was equipped, said tray selection and a separation mechanism section, It is a disk automatic playing device having assembled said cam wheel supporter which supported said disk performance mechanism part to one as one unit, and installing both units in said frame.

[0014]

[Example]Drawing 1 thru/or drawing 24 are referred to for one working example of the disk automatic playing device concerning this invention below. {Composition of a disk storage magazine}, {the using form of a disk storage magazine}, {the composition of the disk automatic playing device which adopted the disk storage magazine and operation of each part}, and {operation by the whole disk automatic playing device} are explained in detail in order of an item.

[0015]{composition of a disk storage magazine} -- first, before explaining the disk automatic playing device concerning this invention, the composition of the disk storage magazine applied here is explained using drawing 1 thru/or drawing 6. They are a perspective view showing the appearance of the disk storage magazine by which drawing 1 is applied to the disk automatic playing device concerning this invention, and the exploded perspective view which drawing 2 decomposed the members forming of the disk storage magazine, and was shown.

[0016]The disk storage magazine 1 (it is hereafter described as the magazine 1) shown in drawing 1 is constituted so that it may mention later, for example, so that the disks (optical disc) 2, such as a compact disk (CD), can be applied to the disk automatic playing device 20 (drawing 7) which carries out an automatic performance selectively.

[0017]Two or more trays 3 (3A - 3C) equipped with the disk 2 are prepared grasping the peripheral part 2a of the disk 2, and the plural laminates of the above-mentioned magazine 1 are densely carried out in the portable initial state shown in drawing 1 on the tray mounting table 4 in which the above-mentioned tray 3 (3A - 3C) serves as a pedestal. And the magazine sliding plate 5 slidable in arrow X<sub>1</sub> and the X<sub>2</sub> direction is changing the framework formation of a part of two or more tray 3 and peripheral part of the tray mounting table 4 into the portable state with the enclosure. In the following explanation, "the state where the tray 3 was laminated densely" is in the state which



the adjacent tray 3 contacted without the crevice mutually, and the tray 3 contacted that there is no crevice also in the tray mounting table 4, and was laminated.

[0018]In the initial state which can carry the magazine 1, the tray 3 which equipped with the disk 2 in the magazine 1, and the tray 3 which has not equipped with the disk 2 can be intermingled. And when the well-known compact disk was stored for every group to the tray 3A of three sheets - 3C, respectively, for example, and the tray 3A - 3C are laminated densely and constituted. Vertical x form width is slightly formed in about 125x125 mm greatly from the outside dimension (120 mm in diameter) of a compact disk among the outside dimensions of the magazine 1, height measurement is formed in about 10 mm and a super-thin type, and its portable performance is good. Although the disk 2 of three sheets is stored in the magazine 1 in working example, what is necessary is just to set up storage number of sheets suitably at the time of a design, and the device 20 (drawing 7) side mentioned later can apply the tray 3 also to the magazine laminated to five layers.

[0019]The magazine 1 is an initial state which can carry the magazine 1 in the 1st position state it is constituted so that three using forms can be taken corresponding to the sliding position of the magazine sliding plate 5, namely, the magazine sliding plate 5 showed to drawing 3, as mentioned later.

And detaching and attaching the disk 2 is regulated.

Being able to carry the magazine 1, and detaching and attaching the disk 2 is permitted in the 2nd position state that the magazine sliding plate 5 showed to drawing 4. In the 3rd position state that laid the magazine 1 in the disk automatic playing device 20 (drawing 7), and the magazine sliding plate 5 showed to drawing 5 and drawing 6. The desired tray 3 is chosen among the trays 3 (3A - 3C) laminated densely on the tray mounting table 4, The desired tray was divided into the tray laminating direction so that the predetermined interval K of the tray 3 of this request caudad (drawing 6) might be maintained, and the gestalt which makes the disk performance mechanism part 130 (drawing 14) face in this predetermined interval K is taken.

[0020]Next, the above-mentioned members forming of the magazine 1 is explained in more detail using drawing 2.

[0021]In drawing 2, the above-mentioned tray mounting table 4 has projected the side plate part 4b in one to the right-angled upper part from the end of the upper surface 4a which was formed in the shape of an L character using the resin material, and was formed in rectangular shape in part by light-gage flatness. The sides 4c and 4d which are right-angled to the side plate part 4b as for each side by the side of the upper surface 4a, detach an interval, and counter in parallel mutually, The R section 4f which the side

4e which separates an interval from the side plate part 4b, and counters in parallel was formed, and the disk 2 turned to the corner which 4 d of sides and the side 4e intersect outside dimension twist 1 further, and was formed in the big diameter of R is formed. And since the disk 2 can be easily detached and attached with the shortest distance from the R section 4f, and the disk performance mechanism part 130 (drawing 14) by the side of the device 20 (drawing 7) can moreover also enter in the shortest move (rocking) distance so that it may mention later, a sequence of operation can be shortened. The above-mentioned magazine sliding plate 5 is formed in one using thin stainless plate material etc., The upper surface 5a is mostly formed in trapezoidal shape evenly, and the side 5b is formed in the side plate part 4b side of the tray mounting table 4, It is as right-angled as this side 5b, and the side plate parts 5c and 5d are bent and formed in the right-angled upper part from the side which detaches an interval and counters in parallel mutually, Bend part 5c<sub>1</sub> and 5c<sub>2</sub> which were bent in small quantities right-angled are formed inside so that the upper surface 5a and an interval may be detached in the upper bed part of the side plate part 5c of a rear side and it may be countered, On the other hand, bend part 5d<sub>1</sub> bent [ inside ] in small quantities right-angled so that the upper surface 5a and an interval might be detached and it might counter is formed in the upper bed part of the side plate part 5d on the backside. [0022]Here, the magazine sliding plate 5 is inserted in the rear-face 4g side of the tray mounting table 4, resisting the elastic force of material and making the side plate parts 5c and 5d of the magazine sliding plate 5 extend in small quantities. under the present circumstances, only the quantity which slides on 4g of rear faces of the tray mounting table 4 from the upper surface 5a of the magazine sliding plate 5 is big -- trapezoid crevice 4g<sub>1</sub> of trapezoidal shape being formed very shallowly, and mostly, The side 4c of the tray mounting table 4, U-shaped crevice 4c<sub>1</sub> [ long picture / 4 d ], and 4d<sub>1</sub> are formed very shallowly. And make trapezoid crevice 4g<sub>1</sub> of 4 g of rear faces, and the upper surface 5a of the magazine sliding plate 5 counter mutually, and it contacts, If the side plate parts 5c and 5d of the magazine sliding plate 5 are made to \*\*\*\* to sides [ 4c and 4d ] U-shaped crevice 4c<sub>1</sub> and 4d<sub>1</sub>, the magazine sliding plate 5 will become slidable linearly in arrow X<sub>1</sub> and the X<sub>2</sub> direction to the tray mounting table 4. These long picture U-shaped crevice 4c<sub>1</sub> and 4d<sub>1</sub> regulated movement of the arrow X<sub>1</sub> direction of the magazine sliding plate 5 at the right end, and have regulated movement of the arrow X<sub>2</sub> direction of the magazine sliding plate 5 at the left end.

[0023]To 4g of rear faces, rectangular hole 4a<sub>1</sub> - 4a<sub>3</sub> penetrate, and are drilled, further, it connects with rectangular hole 4a<sub>1</sub> - 4a<sub>3</sub>, and sector crevice 4a<sub>4</sub> is shallowly formed in the upper surface 4a of the tray mounting table 4. The moved back of the hook member

7 which regulates the sliding range of the magazine sliding plate 5 is carried out to this sector crevice 4a<sub>4</sub> the center [ the axis 6 ]. That is, the extension spring 8 is hung between the end part of the hook member 7, and the upper surface 5a of the magazine sliding plate 5, and this extension spring 8 is formed, without projecting in rectangular hole 4a<sub>1</sub> at the upper surface 4a side. And the hook member 7 is energized by the graphic display clockwise rotation focusing on the axis 6 with the extension spring 8, and this extension spring 8 is energizing the magazine sliding plate 5 in the arrow X<sub>1</sub> direction (the 1st position direction of drawing 3). On the other hand, since piece of end lifting 5a<sub>1</sub> formed in the upper surface 5a of the magazine sliding plate 5 has faced in rectangular hole 4a<sub>2</sub>, it cut, the contact part 7a of the hook member 7 contacted piece of lifting 5a<sub>1</sub>, and rotation of the clockwise rotation of the hook member 7 has been regulated. Before the suspending portion 7b which separated the interval from the contact part 7a, and carried out connection formation at hook shape. Since the narrow above-mentioned piece of end lifting 5a<sub>1</sub> of width is located from both 7a and 7b interval, When only permissible migration length is slidable in arrow X<sub>1</sub> and the X<sub>2</sub> direction, namely, the magazine sliding plate 5 pushes the magazine sliding plate 5 manually, The magazine sliding plate 5 can take now the 1st position state (drawing 3) and the 2nd position state (drawing 4) free. The above-mentioned piece of end lifting 5a<sub>1</sub>, the hook member 7, the extension spring 8, etc. serve as a magazine sliding plate move control means.

[0024]It is formed so that 4g of guide groove 2 may be connected with the rear-face 4g side from the side 4e of the tray mounting table 4 at rectangular hole 4a<sub>3</sub>, Stop release piece 42a<sub>2</sub> (drawing 9) formed in the magazine placing part bottom plate 42 by the side of the device 20 later mentioned to this 4g of guide groove 2 enters in connection with the insertion operation of the magazine 1, Since stop release piece 42a<sub>2</sub> pushes the lock releasing part 7c of the hook member 7 which attended rectangular hole 4a<sub>3</sub>, the hook member 7 resists the extension spring 8, and is rotated to a graphic display counterclockwise rotation focusing on the axis 6, it cuts with the hook member 7, and a stop with piece of lifting 5a<sub>1</sub> is canceled. The above-mentioned stop release piece 42a<sub>2</sub> (drawing 9) serves as a magazine sliding plate move deregulation means.

[0025]The lobe 48b (drawing 9) which corniform crevice 4g<sub>3</sub> was shallowly formed in the rear-face 4g side of the tray mounting table 4, and was formed in the slide member 48 by the side of the device 20 enters, and the magazine 1 is moved to the predetermined mounting position in the device 20. From the sides 4d and 4e of the tray mounting table 4, apply to the upper surface 4a and Separation part 4a<sub>5</sub>, 4a<sub>6</sub>. (It is hereafter described as separation crevice 4a<sub>5</sub> and 4a<sub>6</sub>) is formed shallowly, When the depression lever

(113B) by the side of the device 20 later mentioned to these separation crevice 4a<sub>5</sub> and 4a<sub>6</sub> and 113A (drawing 11) contact, the tray mounting table 4 is caused depressed at the time of separation of the tray 3.

[0026]Next, two or more trays 3 (3A - 3C) densely laminated by the upper surface 4a of the tray mounting table 4 are formed in light-gage flatness using a resin material, and the upper surface 4a and contour shape of the tray mounting table 4 are formed almost equally.

The upper surface 4a of the tray mounting table 4 and each post of the corresponding tray 3 are given with the upper surface 3a, the sides 3b-3e, the R section 3f, and 3 g of rear faces, respectively.

Among two or more trays 3, although only the tray 3A of the highest rung differs in appearance shape from the tray 3B of the lower berth, and 3C in part, as shown also in drawing 1, this Reason, Only the tray 3A of the highest rung is formed in airtight structure so that dust etc. enter and may not adhere to the disk 2 with which it equipped from the upper part, And the rear-face side of the tray 3A is equipped with the disk 2, and since the members forming attached to the tray 3A is altogether the same as that of the lower layer tray 3B and 3C, here explains below using the lower layer tray 3 (3B, 3C).

[0027]In returning to drawing 2 and laminating the above-mentioned tray 3 densely on the upper surface 4a of the tray mounting table 4, Counter the upper surface 4a of the tray mounting table 4, and 3 g of rear faces of the tray 3 are made to contact, and it has laminated so that the side 3b of the tray 3 may be located inside the side plate part 4b of the tray mounting table 4 and the sides 3c-3e of the tray 3 and the R section 3f may be made to agree with the sides 4c-4e of the tray mounting table 4, and the R section 4f. In order to coincide especially the periphery of the R section 3f, making it counter with the periphery of the R section 4f, Since attachment and detachment of the disk 2 can be easily performed in the shortest distance and the disk performance mechanism part 130 (drawing 14) by the side of the device 20 (drawing 7) can enter in the shortest move (rocking) distance like the R section 4f, a sequence of operation can be shortened. The portable performance of the sides other than the R section 3f and 4f is good, without the magazine 1 rolling, since it is formed in rectangular shape as described above. As for the R section 3f of the tray 3, as for this portion, the loading slot which is a grade into which dust etc. do not enter is formed, without being formed in thickness thinner than other circumferences, and damaging the disk 2 so that attachment and detachment of the disk 2 can be performed, even when it laminates densely.

[0028]Long picture 1st crevice 3c<sub>1</sub> and 3d<sub>1</sub> to which the side plate parts 5c and 5d of the

above mentioned magazine sliding plate 5 \*\*\*\* are formed in the sides 3c and 3d of the tray 3 very shallowly. These long picture 1st crevice 3c<sub>1</sub> and 3d<sub>1</sub> regulated movement of the arrow X<sub>1</sub> direction of the magazine sliding plate 5 at the right end, and have regulated movement of the arrow X<sub>2</sub> direction of the magazine sliding plate 5 at the left end. At the time of separation of the tray 3 which bend part 5c<sub>1</sub> of the magazine sliding plate 5, 5c<sub>2</sub>, somewhat larger 2nd crevice 3c<sub>2</sub> than 5d<sub>1</sub>, 3c<sub>3</sub>, and 3d<sub>2</sub> are formed inside 1st crevice 3c<sub>1</sub> and 3d<sub>1</sub>, and is mentioned later. By movement of the arrow X<sub>2</sub>-way of the magazine sliding plate 5, 2nd crevice 3c<sub>2</sub> of the laminated tray 3, 3c<sub>3</sub>, and 3d<sub>2</sub> can escape from and come out of bend part 5c<sub>1</sub>, 5c<sub>2</sub>, and 5d<sub>1</sub>, and permit upper \*\* of the tray 3.

[0029]Almost bigger central hole 3a<sub>1</sub> in a center section of the upper surface 3a of the tray 3 than central hole 2b of the disk 2 is penetrated and drilled in 3 g of rear faces.

And circular recess 3g<sub>1</sub> which stores the disk 2 inserted in the rear-face 3g side from the R section 3f focusing on this central hole 3a<sub>1</sub> is formed shallowly somewhat more greatly than the outside dimension of the disk 2.

Only circular recess 3g<sub>1</sub> is formed without drilling the central hole 3a in the tray 3A of the highest rung.

[0030]It is provided so that the disk grasping lever 9 (9A, 9B) of the couple which grasps the peripheral part 2a of the disk 2 stored in circular recess 3g<sub>1</sub> may counter mostly mutually by the upper surface 3a side of the tray 3 near the left-in-the-figure top corner near the bottom corner of figure Nakamigi. These disk grasping levers 9 (9A, 9B) are supported focusing on the axes 10 and 10, being energized by the torsion spring 11 (11A, 11B) in crevice 3a<sub>2</sub> shallowly formed in the upper surface 3a, and 3a<sub>3</sub> so that it may not project, when the tray 3 is laminated, enabling free rotation.

That is, the downward disk grasping lever 9A is clockwise energized focusing on the axis 10 by the torsion spring 11A, and, on the other hand, the upper disk grasping lever 9B is counterclockwise energized focusing on the axis 10 by the torsion spring 11B.

Under the present circumstances, the grasping parts 9a and 9a formed in the end part of the disk grasping lever 9 attend 3 g of rear faces from breakthrough 3a<sub>4</sub> and 3a<sub>5</sub>, and grasp the peripheral part 2a of the disk 2, Crevice 3e<sub>1</sub> formed in 2nd crevice 3d<sub>2</sub> and the side 3e which were formed in 3 d of sides is faced the pressing parts 9b and 9b formed in the other end through the axes 10 and 10. And when the disk grasping release lever 121A (drawing 11) by the side of the device 20 later mentioned to these pressing parts 9b and 9b and (121B) contact, it has come to be able to carry out the grasping release of the disk 2 easily from the tray 3 at the time of separation of the tray 3. Since it counters mostly, the above-mentioned disk grasping lever 9 (9A, 9B) is formed near the side edge part of the tray 3 and the disk 2 is certainly grasped on the tray 3, when the magazine 1

is carried, worrying about vibration, the carrying direction, etc. disappears. Conveyance of working [ which equips the device 20 with the magazine 1, and chooses and separates the desired tray 3 ], and the disk 2 can be ensured. Gravity can be resisted and the disk 2 with which circular recess 3g<sub>1</sub> by the side of the rear face 3g of the tray 3 was equipped can be firmly grasped on the tray 3.

[0031]By the rear-face 3g side of the tray 3, near the left-in-the-figure top corner near the bottom corner of figure Nakamigi, 2nd separation part 3g<sub>2</sub> and 3g<sub>3</sub> (it is hereafter described as 2nd separation crevice 3g<sub>2</sub> and 3g<sub>3</sub>) are formed shallowly, When the two claw parts 111a and 111b (drawing 11) of the lifter 111A (111B) by the side of the device 20 later mentioned to these 2nd separation crevice 3g<sub>2</sub> and 3g<sub>3</sub> enter, The tray 3 and the magazine placing part superior lamella 41 (drawing 9) elastic to a tray laminating direction can be moved up and down now to one at the time of separation of the tray 3.

[0032]From the sides 3d and 3e of the tray 3, apply to the upper surface 3a and 1st separation part 3a<sub>6</sub>, 3a<sub>7</sub>. (It is hereafter described as 1st separation crevice 3a<sub>6</sub> and 3a<sub>7</sub>) is formed shallowly, These 1st separation crevice 3a<sub>6</sub> and 3a<sub>7</sub> are provided in separation crevice 4a<sub>5</sub> of the above mentioned tray mounting table 4, 4a<sub>6</sub>, and the corresponding position, When the depression lever (113B) by the side of the device 20 mentioned later and 113A (drawing 11) enter, the downward selected tray 3 and/or the tray mounting table 4 of the tray 3 are depressed at the time of separation of the tray 3. By the upper surface [ of the tray 3 ] 3a, and upper surface 4a side of the tray mounting table 4, near the left-in-the-figure top corner near the bottom corner of figure Nakamigi, the guide pins 12 and 12 used as the tray positioning means which positions the time of lamination of the tray 3 project up, respectively, and are provided. A graphic display is omitted, although it counters with these guide pins 12 and tooling holes are drilled in 3g of rear faces of the tray 3. By having formed the above-mentioned guide pin 12, even if it separates the tray 3, on the tray mounting table 4, the tray 3 can be positioned certainly and can be laminated again. The tray positioning means should just be a structure which carries out concavo-convex fitting, without restricting to the guide pin 12.

[0033]The axis 13 has adhered near the side plate part 4b on the upper surface 4a of the tray mounting table 4. Two or more disk eject levers 15 energized by the torsion spring 14 are supported by this axis 13, enabling free rotation, and a part of peripheral part 2a of the disk 2 with which the tray 3 was equipped independently, respectively can be extruded now besides the R section 3f of the tray 3. And it is equipped with these disk eject levers 15 inside at notch section 3b<sub>1</sub> formed in the side 3b of the tray 3 in the state where it was attached pivotally.

If the lever part 15a is pushed with a finger, in order for the disk eject lever 15 to resist the torsion spring 14 and to rotate counterclockwise focusing on the axis 13, While the extrusion part 15b contacts the peripheral part 2a of the disk 2 and resists the retention span of the disk 2, the disk 2 can be extruded in the direction of R section 3f of the tray 3. Under the present circumstances, the space which faces the lever part 15a by notch section 3b<sub>1</sub> of two or more sheets as shown in drawing 1 is secured to the side 4c side of the tray mounting table 4. It constitutes from working example so that two or more disk eject levers 15 may be formed and each may extrude the disk 2 manually independently, but it may constitute so that the disk 2 of two or more sheets may be extruded at a time with a single disk extrusion lever.

[0034]{Using form of disk storage magazine} drawing 3 thru/or drawing 6 are the figures for explaining the using form of a disk storage magazine.

[0035]Only when inserted into the disk automatic playing device 20 (drawing 7), here the magazine 1 by the above-mentioned composition, The desired tray 3 is chosen among the trays 3 laminated densely on the tray mounting table 4, and a desired tray can be divided into a tray laminating direction so that the predetermined interval of the tray 3 of this request caudad may be maintained.

related operation with the device 20 -- just -- \*\* -- it explains simple, and it explains in full detail in the operation by the whole disk automatic playing device 20 mentioned later for details, and explains focusing on the using form of the magazine 1 here.

[0036]Two or more trays 3 which equipped with the disk 2 like drawing 1 in the using form of the magazine 1 shown in drawing 3 are densely laminated on the tray mounting table 4, and framework formation is carried out in [ so that a cellular phone is possible ] one by the magazine sliding plate 5, and. It is the initial state to which the magazine sliding plate 5 moved in the arrow X<sub>1</sub> direction linearly, position regulating was carried out by the energizing force of the extension spring 8 hung between the magazine sliding plate 5 and the hook member 7 in the prescribed position of the graphic display, namely, the magazine sliding plate 5 resulted in the 1st position according to it. In this 1st position state, detaching and attaching the disk 2 on the tray 3 is regulated by the magazine sliding plate 5 which resulted in the 1st position. Namely, if it is going to insert the disk 2 from the R section 3f (or R section 4f of tray mounting table 4) side of the tray 3, The peripheral part 2a of the disk 2 is in the state where end 5d<sub>2</sub> formed in the side plate part 5d of the magazine sliding plate 5 located in the 1st position cannot be contacted from the outside, and the tray 3 cannot be equipped with the disk 2 by this. Since the peripheral part 2a contacts end 5d<sub>2</sub> from the inside even if it extrudes the disk

2 with which the tray 3 was equipped by the disk eject lever 15 in the direction of R section 3f (or the R section 4f), it is in the state where the disk 2 cannot be removed from the tray 3.

[0037]Next, in the using form of the magazine 1 shown in drawing 4. If it is in the state which can carry the magazine 1 like drawing 3, and the extension spring 8 is resisted and the magazine sliding plate 5 is pushed manually, The magazine sliding plate 5 is in the state to which it moved in the arrow X<sub>2</sub> direction linearly, namely, the magazine sliding plate 5 resulted in the 2nd position until piece of end lifting 5a<sub>1</sub> formed in the magazine sliding plate 5 contacts the suspending portion 7b of the hook member 7. In this 2nd position state, detaching and attaching the disk 2 on the tray 3 is permitted by the magazine sliding plate 5 with which end 5d<sub>2</sub> formed in the side plate part 5d was also moving in the arrow X<sub>2</sub> direction, and resulted in the 2nd position. Namely, since end 5d<sub>2</sub> has evacuated so that the contact to the peripheral part 2a of the disk 2 may be canceled, Extrude the disk 2 which could insert the disk 2 from the R section 3f (or R section 4f of tray mounting table 4) side of the tray 3 and with which the tray 3 was equipped by the disk eject lever 15 in the direction of R section 3f (or the R section 4f), and \*\*, Since a part of peripheral part 2a projects from the R section 3f, it is in the state where the disk 2 can be removed easily by hand. And since the framework of two or more trays 3 and tray mounting tables 4 is carried out with the magazine sliding plate 5 when it is in the state which can carry the magazine 1 shown in drawing 3 and drawing 4, it becomes unnecessary to use a box like before, and the magazine 1 is made to a super-thin type.

[0038]Next, in the using form of the magazine 1 shown in drawing 5. inserting the magazine 1 into the disk automatic playing device 20 (drawing 7) -- a tray, as it is in a disengageable state and being mentioned above, Stop release piece 42a<sub>2</sub> formed in the magazine placing part bottom plate 42 (drawing 9) enters into 4g of guide groove 2 (drawing 2) of the tray mounting table 4 from the arrow X<sub>2</sub> direction in connection with the insertion operation of the magazine 1, Stop release piece 42a<sub>2</sub> cuts with the hook member 7 in contact with the lock releasing part 7c of the hook member 7, and cancels a stop with piece of lifting 5a<sub>1</sub>, and. Since stop release piece 42a<sub>2</sub> moves in the arrow X<sub>2</sub> direction further and contacts the side 5e of the magazine sliding plate 5, It is in the state to which the magazine sliding plate 5 moved in the arrow X<sub>2</sub> direction linearly, namely, the magazine sliding plate 5 resulted in the 3rd position via the 2nd position from the 1st position. In this 3rd position state, since bend part 5c<sub>1</sub> of the magazine sliding plate 5, 5c<sub>2</sub>, and 5d<sub>1</sub> agree like a graphic display in 2nd crevice 3c<sub>2</sub> of the tray 3, 3c<sub>3</sub>, and 3d<sub>2</sub>, It permits moving the tray 3 above a laminating direction so that the



laminated tray 3 can escape from and come out of bend part 5c<sub>1</sub>, 5c<sub>2</sub>, and 5d<sub>1</sub> and may carry out the following.

[0039]Then, as shown in drawing 6, after the magazine sliding plate 5 has resulted in the 3rd position. If tray 3C of the bottom is chosen as a desired tray within the device 20 so that it may mention later, The two claw parts 111a and 111b (drawing 11) of the lifter 111A (111B) enter into tray 3C and the tray 3B, And if it depresses to the tray mounting table 4, a lever (113B) and 113A (drawing 11) enter and the lifters 111A and 111B are upper-\*(ed) after this, Since it moves above a laminating direction (the arrow Z<sub>1</sub> direction) while the tray 3A - 3C have been dense laminating conditions, and the tray mounting table 4 is held in the position as it is on the other hand, the predetermined interval K is maintained between tray 3C of the bottom, and the tray mounting table 4. The disk performance mechanism part 130 can enter now in this predetermined interval K. Therefore, since the disk 2 can be performed at the place in which the magazine 1 was laid, it becomes unnecessary to provide the performance place of the disk 2 independently, the occupation area by the side of the device 20 can be set up small, and it can contribute to the miniaturization of the device 20. Since tray 3C of the bottom is laid in the tray mounting table 4 and the trays 3B and 3A move up when the middle tray 3B is chosen, the predetermined interval K for the disk performance mechanism part 130 to enter between the tray 3B and tray 3C is maintained. When the tray 3A of the highest rung is chosen, the tray 3A moves up, tray 3C and 3B are laid in the tray mounting table 4, and the predetermined interval K is maintained between the tray 3A and the tray 3B.

[0040]{the composition of a disk automatic playing device, and operation of each part} -- here explains the entire configuration of the disk automatic playing device concerning this invention using drawing 7 thru/or drawing 24.

[0041]the perspective view and drawing 8 which drawing 7 showed the entire configuration of the disk automatic playing device concerning this invention and in which the initial state was shown showed the state where the tray was separated within the disk automatic playing device -- it is a fracture perspective view in part.

[0042]In the disk automatic playing device 20 (it is hereafter described also as the device 20) concerning this invention shown in drawing 7 and drawing 8. The disk storage magazine 1 (it is hereafter described also as the magazine 1) explained previously is used, This magazine 1 is inserted in the magazine placing part 45 of the magazine placement mechanism part 40 provided in the device 20, the tray shown in drawing 5 in connection with insertion operation -- it laying in a predetermined mounting position and in the disengageable framework state, Divide a desired tray into

a tray laminating direction so that the desired tray 3 may be chosen among the trays 3 densely laminated by the tray mounting table 4 in this mounting position and the predetermined interval K of the desired tray 3 caudad (drawing 6) may be maintained, and. It is made to face under the tray 3 of a request of the disk performance mechanism part 130 by which rocking support was carried out as shown in drawing 8 (inside of the predetermined interval K), Chucking only of the disk 2 with which the desired tray 3 was equipped is carried out on the turntable 143, And it constituted so that it might be made to evacuate to about 143 turntable, maintaining the predetermined interval K and the desired tray 3 in which the disk 2 was removed might be performed by the optical pickup 145.

[0043]The frame 21 from which the outline composition of the device 20 serves as that of the pedestal of the device 20, The magazine placement mechanism part 40 and the sliding mechanism section 60 which constitute a magazine placing means, The tray selection and the separation mechanism section 90 (90A, 90B) of the sliding mechanism section 60, the cam wheel supporter 70, and a couple which constitute tray selection and separating mechanism, It can divide roughly into the cam wheel supporter 70 and the disk performance mechanism part 130 which constitute a disk playing means, and the mechanism part of each means is constituted so that it may be respectively mutually in relation to each means as mentioned above and may operate organically.

[0044]The magazine placement mechanism part 40 and the sliding mechanism section 60 are assembled as one unit as a wearing system of the magazine 1 among each above-mentioned mechanism part, As a performance system which performs the disk 2 which chose and separated the tray 3 in the magazine 1 and, with which the desired tray 3 was equipped, The cam wheel supporter 70 which supported tray selection, the separation mechanism section 90, and the disk performance mechanism part 130 to one is assembled as one unit, Both units are assembled and installed in the frame 21, the assembly workability of the device 20 improves remarkably by this, and correspondence at the time of service can also be performed promptly.

[0045]When the magazine 1 of a super-thin type which stored the compact disk is adopted in the above-mentioned disk automatic playing device 20, The outside dimension of the device 20 is compactly stored in well-known DIN standard size (width x depth x height = 180x150x50 mm), for example, it becomes the optimal as a disk automatic playing device for small mount. Hereafter, order is explained to details about each above-mentioned mechanism part later on, respectively.

[0046]As the < frame 21 was shown in > drawing 7, the frame 21 used as that of the pedestal of the device 20 forms the flat bottom 21a using a sheet metal board etc., is

bent from the both sides of this bottom 21a to the upper part, and counters and forms the sides 21b and 21c, and sectional shape is formed in the U shape. And the outside dimension of the frame 21 is compactly formed so that it may be settled in said DIN standard.

[0047]Drawing 2, drawing 3, drawing 5, drawing 7 - drawing 9 are used together and explained about the <magazine placement mechanism part 40> magazine placement mechanism part 40. Drawing 9 is a figure expanding and showing a magazine placement mechanism part.

[0048]Fixed installation of the above-mentioned magazine placement mechanism part 40 is carried out to the bottom 21a ahead of the frame 21.

The function to lay the magazine 1 enabling free attachment and detachment, and the function which cancels the locked state (drawing 3, the 1st and 2nd position state of drawing 4) of the magazine sliding plate 5 mentioned above by the insertion operation of the magazine 1, and changes the magazine 1 into a tray disengageable state, It has the function held after separating the tray 3 densely laminated in this mounting position.

[0049]As expanded and shown in drawing 9, in the magazine placement mechanism part 40, the magazine placing part superior lamella 41 is elastically connected with the tray laminating direction via the crossarms 43 and 44 to the magazine placing part bottom plate 42 using the sheet metal board etc. Namely, mutually, the flat faces 41a and 42a of the GAJIN placing part superior lamella 41 and the magazine placing part bottom plate 42 separate up and down, and counter, And the crossarms 43 and 44 of a couple counter mutually the sides 41b, 41c, 42b, and 42c, it is connected elastically, and the framework is carried out as the magazine placing part 45. The pantograph mechanism of the well-known provided enabling free rotation is used for the crossarms 43 and 44 of the above-mentioned couple, making two arms cross.

The sliding direction (tray laminating direction) is made to expand and contract only the magazine placing part superior lamella 41 in parallel to the magazine placing part bottom plate 42.

[0050]The above-mentioned magazine placing part superior lamella 41 and the magazine placing part bottom plate 42, The flat faces 41a and 42a which counter mutually are formed in shape almost equivalent to the magazine 1, in the state where the magazine placing part superior lamella 41 has shrunk, an interval is detached and the loading slot 45a is formed so that the magazine 1 (drawing 3) of the 1st above

mentioned position state can be inserted. The right lateral [ of the magazine placing part superior lamella 41 and the magazine placing part bottom plate 42 ] 41b andb [ 42 ] side, it corresponding with the side plate part 5c (drawing 2) of the magazine sliding plate 5 inserted, and, It is located in the right lateral 21b side of the frame 21, and the opening 45b which the disk performance mechanism part 130 can face is formed in the R sections 41f and 42f of the method of the back connected with a part of left laterals 41c and 42c and the left laterals 41c and 42c, The R sections 41f and 42f correspond with the R sections 3f and 4f of the tray 3 and the tray mounting table 4.

[0051]This piece of end lifting 42a<sub>1</sub> by cutting caudad from the flat face 42a of the above-mentioned magazine placing part bottom plate 42, forming piece of lifting 42a<sub>1</sub>, and fixing to the bottom 21a of the frame 21, Few intervals are formed between the flat face 42a and the bottom 21a, and the sliding plate 61 (two-dot chain line) later mentioned at this interval can move now in arrow X<sub>1</sub> and the X<sub>2</sub> direction. To the method of the back of the flat face 42a of the magazine placing part bottom plate 42, stop release piece 42a<sub>2</sub> used as a magazine sliding plate move deregulation means cuts up, and lifting formation is carried out at it. And when the magazine 1 of the 1st position state (drawing 3) is inserted, it enters into 4g of guide groove 2 (drawing 2) which stop release piece 42a<sub>2</sub> formed in 4 g of rear faces of the tray mounting table 4 in connection with insertion operation, Stop release of the hook member 7 used as a magazine sliding plate move control means is carried out, and the magazine sliding plate 5 is moved in the arrow X<sub>2</sub> direction to the 3rd position state (drawing 5). By this operation, the magazine 1 is [ which was shown in drawing 5 ] tray disengageable.

[0052]Slide hole 42a<sub>3</sub> of long rectangular shape is drilled by the method of the back of the flat face 42a of the magazine placing part bottom plate 42. The lever 47 which rotates the axis 46 as a center from the back side of the flat face 42a was formed, and the slide member 48 hung by the tip part of the lever 47 has fitted into slide hole 42a<sub>3</sub>. Formed protruding of the tip restricting part 48a to which the slide member 48 carries out position regulating of the path-of-insertion front of the tray mounting table 4 is carried out to the upper part here, It is formed so that the lobe 48b which fits into corniform crevice 4g<sub>3</sub> (drawing 2) formed in 4 g of rear faces of the tray mounting table 4 at the near side may be energized by the flat spring (not shown) and can appear the inside of slide hole 42a<sub>3</sub> frequently.

[0053]And if position regulating of the path-of-insertion front of the tray mounting table 4 is carried out in contact with the tip restricting part 48a and the lobe 48b fits into corniform crevice 4g<sub>3</sub> when the magazine 1 is inserted with hand control, The slide member 48 moves in the arrow X<sub>1</sub> direction at the magazine 1 and one, and the lever 47

rotates the axis 46 clockwise as a center. At this time, the pin 49 which adhered to the lever 47 has fitted into a "\*\*\*\*\*-like" "\*\*\*\*\*" part like a graphic display. [ which was formed in the flat face 61a of the downward sliding plate 61 ] [ of cam-groove 61a<sub>2</sub> ] Then, since the pin 49 will move along with a "\*\*\*\*\*-like" "\*\*\*\*\*" part if the sliding plate 61 is automatically moved in the arrow X<sub>1</sub> direction, the magazine 1 is inserted to the method of the back via the slide member 48 hung by the tip part of the lever 47. [ of cam-groove 61a<sub>2</sub> ] Here, the magazine 1 inserted to the method of the back contacts the stopper parts 41e and 42e for positioning bent and formed in the method of the path-of-insertion back of the magazine placing part superior lamella 41 and the magazine placing part bottom plate 42, and positioning installation is carried out in a predetermined mounting position. When carrying out selection operation of the desired tray 3, without a "straight-line" part participating in movement of the magazine 1 when the pin 49 moves to the "\*\*\*\*\*" "straight-line" part from a part of "\*\*\*\*\*-like" cam-groove 61a<sub>2</sub>, it is an escape hole for moving only the sliding plate 61 in the arrow X<sub>1</sub> direction further.

[0054]Stopper part 41f<sub>1</sub> for erroneous insertion prevention bends in the R section 41f close to the stopper part 41e for positioning of the magazine placing part superior lamella 41 caudad, and is formed in it. Here, except R section 4f of the R section 3f of the tray 3, or the tray mounting table 4, since stopper part 41f<sub>1</sub> for erroneous insertion prevention is formed in the R section 41f, when it inserts from the direction which mistook the magazine 1, since it does not agree, the erroneous insertion of the magazine 1 can be certainly detected with an easy structure.

[0055]Notch hole 42b<sub>1</sub> is caudad formed in the right lateral 42b of the magazine placing part bottom plate 42, and projected piece 42b<sub>2</sub> is formed above this notch hole 42b<sub>1</sub>. The moved back of the magazine insertion detection lever 50 is carried out to the flat face 42a by the side of the right lateral 42b the center [ the axis 51 ]. While the switch lever 52 for magazine insertion detection is clockwise energized focusing on the axis 54 with the extension spring 53, the moved back is carried out to the right lateral 42b. And since the front-face corner of the path of insertion of the tray mounting table 4 will contact the contact part 50a of the magazine insertion detection lever 50 and the magazine insertion detection lever 50 will rotate counterclockwise focusing on the axis 51 if the magazine 1 is inserted, The end part 52a of the switch lever 52 for magazine insertion detection is pushed, and the pressing part 50b which attended notch hole 42b<sub>1</sub> resists the extension spring 53, and rotates the switch lever 52 for magazine insertion detection counterclockwise focusing on the axis 54. When this separates from switch SW<sub>1</sub> which was formed in the other end of the switch lever 52 for magazine insertion detection and

which was bent and the piece 52b soldered to the wiring board 23 (drawing 7) by the side of the right lateral 21b of the frame 21, it has detected that the magazine 1 was inserted. The operation timing of switch SW<sub>1</sub> is shown in drawing 24.

[0056]The hooking portion 55a is formed in an end part, and while the locking lever 55 which adhered the pin 56 to the other end is clockwise energized focusing on the axis 58 with the extension spring 57, the moved back is carried out to the right lateral 42b of the magazine placing part bottom plate 42. The hooking portion 55a of this locking lever 55 can engage now with piece of bending 41b<sub>1</sub> formed in the right lateral 41b of the magazine placing part superior lamella 41. And flat cam surface 61b<sub>2</sub> formed in the right lateral 61b of the sliding plate 61 which the pin 56 mentions later is contacted, And since the hooking portion 55a bends and it is engaging with piece 41b<sub>1</sub> when the magazine placing part superior lamella 41 has shrunken to the magazine placing part bottom plate 42, the magazine placing part 45 is locked mechanical. Since the pin 56 will move to sloped cam surface 61b<sub>1</sub> of the near side connected with this from flat cam surface 61b<sub>2</sub> if the sliding plate 61 moves in the arrow X<sub>1</sub> direction, As shown in drawing 8, the lock of the magazine placing part superior lamella 41 and the magazine placing part bottom plate 42 is canceled, and the up-and-down motion of the magazine placing part superior lamella 41 is attained. The mechanical locking action timing of the magazine 1 is shown in drawing 24.

[0057]Drawing 7 - drawing 10 are used together and explained [ sliding mechanism section / 60 / > ] about the < sliding mechanism section 60. Drawing 10 is a perspective view developing and showing a part of inside of a disk automatic playing device.

[0058]The above-mentioned sliding mechanism section 60 is slidably formed via a driving source between the bottom 21a of the frame 21, and the rear face of the magazine placing part bottom plate 42, as explained previously, The function which moves automatically the magazine 1 inserted in the magazine placement mechanism part 40 to a predetermined mounting position, It has the function which moves in order to choose and separate the desired tray 3, and the function which moves this cam wheel supporter 70 up and down to a tray laminating direction gradually while supporting the cam wheel supporter 70.

[0059]As shown in drawing 10, develop and in the above-mentioned sliding mechanism section 60. Using a sheet metal board etc., the sliding plate 61 bends sectional shape to a U shape, and is formed, It bends from the both sides of this flat face 61a to the upper part, and the sides 61b and 61c counter, and it is formed [ the flat face 61a is formed in the bottom 21a side of the frame 21, and ], and the sides 61b and 61c have countered within the side 21b of the frame 21, and 21c.

[0060]slide hole 61a<sub>1</sub> and 61a<sub>1</sub> which guide the sliding plate 61 in arrow X<sub>1</sub> and the X<sub>2</sub> direction along with the guide pins 22 and 22 which adhered to the bottom 21a of the frame 21 being drilled in the flat face 61a of the sliding plate 61, and, The above mentioned "\*\*\*\*-like" cam-groove 61a<sub>2</sub> is drilled, and notch section 61a<sub>3</sub> for escaping fittings and 61a<sub>4</sub> are formed further the method of the back, and ahead [ of the left lateral 61 / inside ].

[0061]The rack 62 has adhered inside the left lateral 61c of the sliding plate 61, and this rack 62 is connected with motor M<sub>1</sub> via the deceleration mechanism part 24 installed in the bottom 21a of the frame 21 within notch section 61a<sub>4</sub>. And the magazine 1 is automatically inserted in the method of the back by switch SW<sub>1</sub>'s separating, as mentioned above, and the motor M<sub>1</sub>'s operating, and moving in the arrow X<sub>1</sub> direction and carrying out the sliding plate 61, after detecting that the magazine 1 was inserted. The operation timing of the sliding plate 61 is shown in drawing 24.

[0062]Said sloped cam surface 61b<sub>1</sub> and said flat cam surface 61b<sub>2</sub> are formed in the right lateral 61b of the sliding plate 61 at a near side, Yamagata-like cam-groove 61b<sub>3</sub> and stair-like cam-groove 61b<sub>4</sub> are formed in the right lateral 61b of the method of the back corresponding to tray laminating order. On the other hand, Yamagata-like cam-groove 61c<sub>1</sub> of the above and the shape of isomorphism and stair-like cam-groove 61c<sub>2</sub>, and 61c<sub>3</sub> are formed also in the left lateral 61c of the sliding plate 61. To the above-mentioned stair-like cam-groove 61b<sub>4</sub>, 61c<sub>2</sub>, and 61c<sub>3</sub>. The pins 74A-74C which adhered to the bottom plate 72 of the cam wheel supporter 70 mentioned later are inserted in, respectively, It is inserted in longitudinal hole 21b<sub>1</sub> which these pins 74A-74C extended, and was drilled in the sides 21b and 21c of the frame 21 in the tray laminating direction, 21c<sub>1</sub>, and 21c<sub>2</sub>, respectively. Therefore, it collaborates with movement of the sliding plate 61, and the cam wheel supporter 70 can move up and down to a tray laminating direction gradually according to the shape of stair-like cam-groove 61c<sub>2</sub> and 61c<sub>3</sub>, At this time, the cam wheel supporter 70 is regulated by the cross direction by longitudinal hole 21b<sub>1</sub>, 21c<sub>1</sub>, and 21c<sub>2</sub>.

[0063]As mentioned above using drawing 9, to sloped cam surface 61b<sub>1</sub> and flat cam surface 61b<sub>2</sub> which were formed in the right lateral 61b of the sliding plate 61. The pin 56 which adhered to the locking lever 55 (drawing 9) has contacted, and the pin 26 which adhered to the initial detection lever 25 which presses switch SW<sub>2</sub> which detects an initial state is in contact with sloped cam surface 61b<sub>1</sub> further. The moved back of the above-mentioned initial detection lever 25 is carried out to the outside of the right lateral 21b of the frame 21 the center [ the axis 28 ] with the extension spring 27.

In the state where the pin 26 is in contact with sloped cam surface 61b<sub>1</sub>, it is judged that

the device 20 is an initial state.

By this initial detecting operation, the attachment-and-detachment propriety of the magazine 1 is judged. The operation timing of this switch SW<sub>2</sub> is shown in drawing 24. [0064]Drawing 7 - drawing 14 are used together and explained about the <cam wheel supporter 70> cam wheel supporter 70. A figure for drawing 11 - drawing 13 to explain the tray selection in a cam wheel supporter and a separation mechanism section and drawing 14 (A) and (B) are the figures for explaining the disk performance mechanism part in a cam wheel supporter.

[0065]As shown in drawing 10, the above-mentioned cam wheel supporter 70, It is installed in the outside of the predetermined mounting position of the magazine 1, and is supported by the sliding plate 61, It collaborates with the sliding plate 61 which moves according to the selection operation of the desired tray 3, and moves up and down to a tray laminating direction gradually via stair-like cam-groove 61b<sub>4</sub>, 61c<sub>2</sub>, and 61c<sub>3</sub>. The 1st and 2nd cam wheel 76 and 77 that connected the above-mentioned cam wheel supporter 70 with the driving source, Drive by the 1st and 2nd cam wheel 76 and 77, and it collaborates with movement of the sliding plate 61, The desired tray 3 is chosen among the trays 3 densely laminated by the tray mounting table 4 in the magazine 1 which moved to the method of the back of the device 20, The function to divide a desired tray into a tray laminating direction so that the predetermined interval of the tray 3 of this request caudad may be maintained, The function to lay only the disk 2 with which the desired tray 3 was equipped in the turntable 143 (drawing 14), Tray selection and the separation mechanism section 90 (90A, 90B) of a couple provided with the function to evacuate the desired tray 3 in which the disk 2 was removed to about 143 turntable while maintaining a predetermined interval, The desired tray 3 is driven by the 1st cam wheel 76 after selection and separation, The disk performance mechanism part 130 provided with a means to make it face corresponding to the height position of the predetermined interval of the lower part of the tray 3 which laid the desired disk, and to perform the disk 2 in this position which can be rocked is formed in the "inverse L-shaped" frame 71 in one.

[0066]Among the above-mentioned members forming, a predetermined height interval is separated from the bottom plate 72, and it carries out, the superior lamella 73 is attached, framework formation is carried out, a sheet metal board etc. are used for "inverse L-shaped", and the frame 71 used as the pedestal of the cam wheel supporter 70 is formed, if plane shape sees from this side. When the magazine 1 is laid, the R sections 3f and 4f (drawing 2) of the tray 3 and the tray mounting table 4 and the R sections 72f and 73f which counter are formed in the bottom plate 72 and the superior



lamella 73.

Since the area of the bottom plate 72 and the superior lamella 73 can be especially formed widely with R sections [ 72f and 73f ] shape, The disk performance mechanism part 130 which can install the 1st and 2nd cam wheel 76 and 77 near the R section 73f, and is mentioned later in between near the R section 72f of the superior lamella 73 near the R section 72f of the bottom plate 72 can be stored with sufficient area efficiency.

[0067]The pins 74A-74C have adhered to the sides 72b and 72c of the bottom plate 72, It is inserted in stair-like cam-groove 61b<sub>4</sub> formed in the sliding plate 61 as these pins 74A-74C mentioned above, 61c<sub>2</sub>, and 61c<sub>3</sub>, respectively, It is inserted in \*\* hole 21b<sub>1</sub> formed in the frame 21, 21c<sub>1</sub>, and 21c<sub>2</sub>, respectively. Thereby, the cam wheel supporter 70 has composition which collaborates with movement of the sliding plate 61 and can move up and down to a tray laminating direction gradually as mentioned above.

[0068]The 1st cam wheel 76 that geared via the motor M2 and the deceleration mechanism part 75 used as a driving source, and the 2nd cam wheel 77 that geared to the 1st cam wheel 76 are supported by the superior lamella 73, enabling free rotation. Two or more cam grooves are formed in the upper surface and the undersurface of the 1st and 2nd cam wheel 76 and 77, The end part of the SUTCHI lever 78 is carrying out the splice to the cam groove 76a formed in the upper surface of the 1st cam wheel 76 among these cam grooves, and the other end of this SUTCHI lever 78 attaches and detaches switch SW<sub>4</sub> and SW<sub>5</sub> which were soldered to the wiring board 79, and is controlling the motor M2. The operation timing of these switch SW<sub>4</sub> and SW<sub>5</sub> is shown in drawing 24.

[0069]One pair of the tray selection and the separation mechanism section 90 (90A, 90B) which were connected with the 1st and 2nd cam wheel 76 and 77 are provided in the bottom plate 72 and the superior lamella 73.

Namely, they are allocated by the tray selection and the separation mechanism section 90A which are driven by the 2nd cam wheel 76 and 77 on the superior lamella 73 by the side of the back of the device 20, and on the superior lamella 73 by the side of the front left of the device 20, The tray selection and the separation mechanism section 90B which are driven by the 1st cam wheel 77 are allocated, and although both the mechanism parts 90A and 90B differ in connection relations in part, the synchronous drive of them is carried out by the engagement relation of the 1st and 2nd cam wheel 76 and 77 using the almost equivalent mechanism member.

[0070]Tray selection and the separation mechanism sections 90A and 90B of a couple,

The lifter parts 100A and 100B provided with the lifters 111A and 111B and the depression levers 113A and 113B, It comprises the disk grasping release parts 120A and 120B provided with the disk grasping release levers 121A and 121B, respectively, When the connecting plate 91 which engaged with the cam groove 77a formed in the upper surface of the 2nd cam wheel 77 among these each part slides in arrow Y<sub>1</sub> and the Y<sub>2</sub> direction, When the lifter part 100A is operated and the connecting plate 93 which engaged with the cam groove (not shown) formed in the undersurface of the 2nd cam wheel 77 slides in arrow Y<sub>1</sub> and the Y<sub>2</sub> direction, it carries out by operating the disk grasping release part 120A.

[0071]When the connecting plate 95 which engaged with the cam groove 76b formed in the upper surface of the 1st cam wheel 76 on the other hand slides in arrow X<sub>1</sub> and the X<sub>2</sub> direction, When the lifter part 100B is operated and the connecting plate 96 which engaged with the cam groove 76c formed in the upper surface of the 1st cam wheel 76 slides in arrow X<sub>1</sub> and the X<sub>2</sub> direction, the disk grasping release part 120B is operated.

[0072]Here, only the tray selection and the separation mechanism section 90A which were installed in the back side of the device 20 are explained using drawing 11 - drawing 13 for the sake of the convenience accompanied by the graphic display of operation of switch SW<sub>3</sub>, and explanation is omitted about the tray selection and the separation mechanism section 90B of a near side which carry out the same operation synchronizing with this. The state where the lifter projected drawing 12 ahead by drawing 11 showing the initial state by which the magazine is not inserted in the sliding plate when a sliding plate moved to the method of the back is shown, and drawing 13 shows the state where the lifter went up after the sliding plate had moved to the method of the back.

[0073]As shown in drawing 11 - drawing 13, the lifter part 100A is provided with the lifter 111A and the depression lever 113A. That is, in the lifter part 100A, L character bracket 101 bent in the shape of an L character at the upper right of the bottom plate 72 is installed, and the 1st vertical plane 101a and the 2nd vertical plane 101b that was connected with this and bent right-angled in the direction of this side are formed. Level hole 101a<sub>1</sub> is drilled in the 1st vertical plane 101a up, vertical hole 101a<sub>2</sub> is drilled near the 2nd vertical plane 101b, and arch hole 101a<sub>3</sub> is further drilled between level hole 101a<sub>1</sub> and vertical hole 101a<sub>2</sub>. The "\*\*\*\*\*-like" lever 105 which adhered the three pins 102-104, It is made to project to the front, making the upper pin 102 fit into level hole 101a<sub>1</sub>, and making the central pin 104 fit into arch hole 101a<sub>3</sub>, and it is made to project to the front, making the downward pin 103 fit into vertical hole 101a<sub>2</sub>. The lever 107 is supported by the fulcrum in the axis 106 which adhered to the 1st vertical plane 101a in

the upper part of vertical hole 101a<sub>2</sub> of L character bracket 101, and the downward end part is engaging with the pin 104 projected from the center of the "\*\*\*\*\*-like" lever 105 to this side. The "L character-like" lever 109 is supported by the fulcrum in the axis 108 which adhered to the 1st vertical plane 101a in the lower part of level hole 101a<sub>1</sub> of L character bracket 101, The pin 92 which adhered to the bent part 91a of the connecting plate 91 engages with the end part of the "shape of this L character" lever 109, and the pin 104 projected from the center of the "\*\*\*\*\*-like" lever 105 to this side is engaging with the other end through the axis 108. Each above-mentioned lever 105,107,109 constitutes the link mechanism so that the connecting plate 91 which carried out the splice to the cam groove 77a of the 2nd cam wheel 77 may collaborate with the operation which slides in arrow Y<sub>1</sub> and the Y<sub>2</sub> direction.

[0074]The compression spring 110 is inserted in the pin 103 projected from the lower part of the "\*\*\*\*\*-like" lever 105 to this side, It was made to fit in, resisting the compression spring 110 in the lifter 111A from the front at the pin 103, and has regulated that the lifter 111A jumps out in the direction of this side with the snap ring 112. In the above-mentioned lifter 111A, the two claw parts 111a and 111b for moving one up and down the tray 3 (drawing 2) and the magazine placing part superior lamella 41 (drawing 9), Height is changed ahead [ of the magazine 1 / path-of-insertion ] somewhat, it is formed in it, the guide hole 111c for fitting in with the 2nd vertical plane 101b of L character bracket 101 back, and moving up and down is formed, and formed protruding of the arm part 111d and the pin part 111e is further carried out to left and right laterals. The lifter 111A which carried out the above complicated shape is fabricated in one using the resin material. Therefore, the lifter 111A has collaborated with the sliding plate 61 so that it may be slidably supported by the cross direction (arrow X<sub>1</sub>, the X<sub>2</sub> direction) along with the pin 103, being energized by the compression spring 110 and operation of a cross direction may be mentioned later. The lifter 111A has collaborated with rotation of the 2nd cam wheel 77 so that it may be slidably supported by the sliding direction (arrow Z<sub>1</sub>, the Z<sub>2</sub> direction) along the 2nd vertical plane 101b and operation of a sliding direction may be mentioned later.

[0075]Near the lifter 111A, to the bottom plate 72. The depression lever 113A for depressing caudad the tray 3 (drawing 2) and/or the tray mounting table 4 (drawing 2) is supported energizing the axis 115 clockwise as a center with the torsion spring 114, and regulation to the front is performed by the stopper piece 72a of the bottom plate 72. Since the lobe 113a of the right-hand side formed in the depression lever 113A is turning behind the arm part 111d formed in the left-hand side of the lifter 111A and is engaging with it, The depression part 113b formed ahead Operation of the cross

direction (arrow X<sub>1</sub>, the X<sub>2</sub> direction) of the lifter 111A, That is, it collaborates with the operation of the cross direction (arrow X<sub>1</sub>, the X<sub>2</sub> direction) of the claw parts 111a and 111b of the lifter 111A which carries out the following temporarily.

[0076]As explained previously, the pin 74A which adhered to the side 72b of the bottom plate 72 is inserted in stair-like cam-groove 61b<sub>4</sub> formed in the sliding plate 61, and is further inserted in \*\* hole 21b<sub>1</sub> formed in the right lateral 21b of the frame 21. Under the present circumstances, stair-like cam-groove 61b<sub>4</sub> into which the pin 74A fits, Corresponding to tray laminating order, connection formation of the staircase cam part 61b<sub>4</sub>-S is carried out at a near side, and this staircase cam part 61b<sub>4</sub>-S corresponds to the highest rung through a stage from the bottom of the tray 3 laminated to the tray mounting table 4 having covered over this side from the method of the back.

Each stage changes height in the thickness grade of the tray 3 one by one, and is formed in it, and staircase cam part 61b<sub>4</sub>-S is formed so that it can apply also to the magazine which laminated the tray 3 to five layers here.

It connects with the bottom of staircase cam part 61b<sub>4</sub>-S, and rectilinear cam part 61b<sub>4</sub>-L is formed to the method of the back. In the initial state in which the magazine 1 is not inserted in the sliding plate 61, the pin 74A has fitted in, as illustrated to the method of the back of rectilinear cam part 61b<sub>4</sub>-L.

[0077]The 2 crotch-like arm 30 is supported by the outside of the right lateral 21b of the frame 21 focusing on the axis 31, enabling free rotation, and it separates to the switch contact part 30a which attaches and detaches to switch SW<sub>3</sub>, and the bracket contact part 30b which contacts Slide bracket 33 which carries out the following in the shape of 2 crotches, and is formed in it.

[0078]The pin 32 adhered under the switch contact part 30a of the 2 crotch-like arm 30, and this pin 32 has fitted into Yamagata-like cam-groove 61b<sub>3</sub> which penetrated hole 21b<sub>2</sub> drilled in the right lateral 21b of the frame 21, and was formed in the sliding plate 61. Two or more connection formation is carried out corresponding to tray laminating order, Yamagata-like cam part 61b<sub>3</sub>-M connects with the method of the back of Yamagata-like cam part 61b<sub>3</sub>-M Yamagata-like cam-groove 61b<sub>3</sub> into which the pin 32 fits at a near side, and rectilinear cam part 61b<sub>3</sub>-L is formed.

And from the method of the back to the highest rung at the time of laminating from the bottom of the tray 3 to five layers in order toward this side, Yamagata-like cam part 61b<sub>3</sub>-M corresponds and is formed.

In the initial state in which the magazine 1 is not inserted in the sliding plate 61, the pin 32 has fitted into the method of the back of rectilinear cam part 61b<sub>3</sub>-L like a graphic display.

[0079]Elliptical hole 21b<sub>3</sub> is drilled by the method of the back of \*\* hole 21b<sub>1</sub> formed in the right lateral 21b of the frame 21, While it applies inside, it straddles from the outside of the right lateral 21b in this elliptical hole 21b<sub>3</sub> and Slide bracket 33 is energized in the arrow X<sub>2</sub> direction by the tension spring 34, it is provided slidably. The bending part 33a bent almost right-angled on the outside of the right lateral 21b of the frame 21 is formed in this Slide bracket 33, and the lever part 33b which hung caudad from elliptical hole 21b<sub>3</sub> inside the right lateral 21b is formed in it. The bending part 33a of above-mentioned Slide bracket 33 is always pressing the bracket contact part 30b of the 2 crotch-like arm 30 according to the energizing force of the tension spring 34. On the other hand, the pin part 111e formed in the right-hand side of the lifter 111A mentioned above is in contact with the lever part 33b of above-mentioned Slide bracket 33 from back.

The pressure of the pin part 111e is based on the compression spring 110 which is energizing the lifter 111A.

[0080]The operation which collaborates with movement of the sliding plate 61 at the time of selection operation, and moves the claw parts 111a and 111b of the lifter 111A to a cross direction (arrow X<sub>1</sub>, the X<sub>2</sub> direction) here, The operation which carries out temporary collaboration with the lifter 111A, and moves the depression lever 113A to a cross direction (arrow X<sub>1</sub>, the X<sub>2</sub> direction), It collaborates with rotation of the 2nd cam wheel 77, and drawing 11 thru/or drawing 13 are used together and explained about the operation which slides on the lifter 111A along the 2nd vertical plane 101b in a sliding direction (arrow Z<sub>1</sub>, the Z<sub>2</sub> direction).

[0081]As shown in drawing 11, in the initial state in which the magazine 1 (drawing 1) is not inserted in the sliding plate 61. Since the connecting plate 91 which is carrying out the splice to the cam groove 77a of the 2nd cam wheel 77 is moving in the arrow Y<sub>1</sub> direction like a graphic display, It results in the link posture condition which said each lever 105,107,109 which collaborates with this connecting plate 91 illustrated, Among these, the lifter 111A which the pin 103 which adhered to the "\*\*\*\*-like" lever 105 was located in the lowermost end of vertical hole 101a<sub>2</sub>, and fitted into this pin 103 is guided in the 2nd vertical plane 101b, and is located in a lowermost end. Since it has fitted into the method of the back of rectilinear cam part 61b<sub>3</sub>-L of Yamagata-like cam-groove 61b<sub>3</sub> of the sliding plate 61 like a graphic display, the pin 32 which adhered to the 2 crotch-like arm 30 is rotating the 2 crotch-like arm 30 counterclockwise focusing on the axis 31, in view of the inside of the right lateral 21b. At this time, the switch contact part 30a of the 2 crotch-like arm 30 has estranged from switch SW<sub>3</sub>, and. Although the

bracket contact part 30b is in contact with the bending part 33a of Slide bracket 33, Slide bracket 33 resists the energizing force of the tension spring 34, and is pushed in the arrow X<sub>1</sub> direction by rotation of the counterclockwise rotation of the 2 crotch-like arm 30 in the inside of elliptical hole 21b<sub>3</sub>. Therefore, since the pin part 111e of the lifter 111A which is in contact with the lever part 33b of Slide bracket 33 also resists the energizing force of the compression spring 110 and is pushed in the arrow X<sub>1</sub> direction, This pin part 111e and the two one claw parts 111a and 111b evacuate back (the arrow X<sub>1</sub> direction), and the depression part 113b of the depression lever 113A which collaborates with the arm part 111d temporarily also evacuates back (the arrow X<sub>1</sub> direction), and insertion of the magazine 1 is permitted.

[0082]Next, although the graphic display of the magazine 1 (drawing 1) inserted in the sliding plate 61 is omitted in drawing 12, as explained previously, Detect that the magazine 1 was inserted and the sliding plate 61 moves in the arrow X<sub>1</sub> direction, The stopper parts 41e and 42e (drawing 9) for positioning which the tip part of the magazine 1 bent and formed in the method of the back of the magazine placing part superior lamella 41 and the magazine placing part bottom plate 42 are contacted, After positioning installation of the magazine 1 is carried out in a predetermined mounting position, only the sliding plate 61 moves in the arrow X<sub>1</sub> direction further, and the desired tray 3 is beforehand specified by the tray selecting means which is not illustrated at this time. A tray selecting means sets up the movement magnitude of the sliding plate 61 here according to the laminating order watch of the desired tray 3, That is, you are making it located in staircase cam part 61b<sub>4</sub>·S corresponding to the tray 3 which made it located in Yamagata-like cam part 61b<sub>3</sub>·M corresponding to the tray 3 which chose the pin 32, and chose the pin 74A.

[0083]That is, in the state which showed in drawing 12, the case where tray 3C (drawing 1) of the bottom is chosen as the desired tray 3 is explained. If it has stopped in a similar manner with the 2nd cam wheel 77 having been shown in drawing 11 here and only the sliding plate 61 moves in the arrow X<sub>1</sub> direction, The pin 32 which had fitted into the method of the back of rectilinear cam part 61b<sub>3</sub>·L of Yamagata-like cam-groove 61b<sub>3</sub>, It falls into tray 3C of the bottom, and corresponding "slot" of Yamagata-like cam part 61b<sub>3</sub>·M, and the 2 crotch-like arm 30 which adhered rotates the pin 32 clockwise focusing on the axis 31, in view of the inside of the right lateral 21b. And since the switch contact part 30a of the 2 crotch-like arm 30 will contact SW<sub>3</sub> if the 2 crotch-like arm 30 rotates clockwise, movement of the arrow X<sub>1</sub> direction of the sliding plate 61 stops. Simultaneously with the above, the pin 74A which had fitted into the method of the back of rectilinear cam part 61b<sub>4</sub>·L of stair-like cam-groove 61b<sub>4</sub> is located in tray 3C

of the bottom, and corresponding staircase cam part 61b<sub>4</sub>-S. Since the pin 32 reverses the above-mentioned switch SW<sub>3</sub> by passing the "mountain" of Yamagata-like cam part 61b<sub>3</sub>-M, By calculating the pulse at this time, the position of stair-like cam-groove 61b<sub>4</sub> which can detect the laminating order watch of the tray 3, and functions as an integrated type switch, and corresponds with the desired tray 3 at the time of movement of the sliding plate 61 is specified. The operation timing of this switch SW<sub>3</sub> is shown in drawing 24.

[0084]On the other hand, Slide bracket 33 which is in contact with the bracket contact part 30b of the 2 crotch-like arm 30 by rotation of the clockwise rotation of the 2 crotch-like arm 30 slides on the inside of elliptical hole 21b<sub>3</sub> in the arrow X<sub>2</sub> direction according to the energizing force of the tension spring 34. Therefore, since the pin part 111e of the lifter 111A which is in contact with the lever part 33b of Slide bracket 33 is also looked like [ the energizing force of the compression spring 110 ] and moves in the arrow X<sub>2</sub> direction more, The two claw parts 111a and 111b project ahead (the arrow X<sub>2</sub> direction) at this pin part 111e and one, And while the depression part 113b of the depression lever 113A which collaborates with the arm part 111d of the lifter 111A temporarily also rotates clockwise according to the energizing force of the torsion spring 114 and is regulated by the stopper piece 72a, it projects ahead (the arrow X<sub>2</sub> direction). Then, since the two claw parts 111a and 111b of the lifter 111A change height somewhat and are formed, it enters into 2nd separation crevice 3g<sub>2</sub> of the tray 3B of the upper row which adjoined 2nd separation crevice 3g<sub>2</sub> of tray 3C of the bottom and this which showed drawing 2, respectively. Since the depression part 113b of the depression lever 113A which collaborates with the lifter 111A temporarily on the other hand also enters from the upper part of separation crevice 4a<sub>6</sub> of the tray mounting table 4 shown in drawing 2, the tray mounting table 4 is pressed down caudad.

[0085]When it chooses except tray 3C of the bottom, The two claw parts 111a and 111b of the lifter 111A engage with 2nd separation crevice 3g<sub>2</sub> of the tray 3 of the upper row which adjoined selected 2nd separation crevice 3g<sub>2</sub> (drawing 2) of the tray 3 and this, The tray 3 and the elastic magazine placing part superior lamella 41 (drawing 9) can be moved up and down now to one. On the other hand, the depression part 113b of the depression lever 113A engages with selected 1st separation crevice 3a<sub>7</sub> (drawing 2) of the tray 3 of the lower part of the tray 3 or separation crevice 4a<sub>6</sub> of the tray mounting table 4, The tray 3 and/or the tray mounting table 4 can be caudad depressed now.

[0086]Next, although drawing 13 is also omitting the graphic display of the magazine 1 (drawing 1) inserted in the sliding plate 61, as mentioned above, movement of the sliding plate 61 has stopped it in the state of drawing 12.

[0087] Since the connecting plate 91 which is carrying out the splice to the cam groove 77a will move in the arrow Y<sub>2</sub> direction like a graphic display here if the 2nd cam wheel 77 is rotated clockwise, Since the pin 103 which resulted in the link posture condition which said each lever 105,107,109 which collaborates with this connecting plate 91 illustrated, among these adhered to the "\*\*\*\*\*-like" lever 105 moves up along with vertical hole 101a<sub>2</sub>, The lifter 111A which fitted into this pin 103 is guided in the 2nd vertical plane 101b, and moves up. While the pin part 111e of the lifter 111A also contacts the lever part 33b of Slide bracket 33, it moves up. Under the present circumstances, since the sliding plate 61 has stopped, the two claw parts 111a and 111b of the lifter 111A maintain the state where it projected ahead, And since the two claw parts 111a and 111b have entered into 2nd separation crevice 3g<sub>2</sub> (drawing 2) of the tray 3B of the upper row which adjoined 2nd separation crevice 3g<sub>2</sub> (drawing 2) of tray 3C of the bottom, and this, respectively at the time of drawing 12, By upper \*\* of the lifter 111A, while the two claw parts 111a and 111b pinch tray 3C of the bottom, tray 3C of the bottom is moved up. Therefore, the trays 3B and 3A and the elastic magazine placing part superior lamella 41 (drawing 9) which were laminated on tray 3C of the bottom can also be upper\*\*(ed) in one.

[0088] On the other hand, the depression lever 113A which collaborates with the arm part 111d of the lifter 111A temporarily by upper \*\* of the lifter 111A, Although engagement relation is canceled, since it projects ahead (the arrow X<sub>1</sub> direction), rotating clockwise according to the energizing force of the torsion spring 114, and being regulated by the stopper piece 72a, It means having held down caudad separation crevice 4a<sub>6</sub> (drawing 2) of the tray mounting table 4 with as, and the tray mounting table 4 is having laid in the magazine placing part bottom plate 42 (drawing 9) with as. Therefore, it means that a predetermined interval is formed between tray 3C of the bottom, and the tray mounting table 4, and the tray 3 was divided into the tray laminating direction. In this predetermined interval, the disk performance mechanism part 130 (drawing 14) can face.

[0089] After a predetermined interval is formed, if the lifter 111A is dropped slightly, will become possible to lay only the disk 2 with which tray 3C of the bottom was equipped in the turntable 143 (drawing 14), so that it may mention later, and. Then, if the lifter 111A is upper\*\*(ed) again slightly, it will become possible to evacuate tray 3C of the bottom where the disk 2 was removed above the turntable 143 (drawing 14), maintaining a predetermined interval. When it chooses except tray 3C of the bottom, Since it moves up and down gradually to a predetermined height position via the tray 3 which the cam wheel supporter 70 holding the lifter 111A (111B) and the depression



lever 113A (113B) chose, corresponding Yamagata-like cam part 61b<sub>3</sub>-M, and staircase cam part 61b<sub>4</sub>-S, The tray 3 and the magazine placing part superior lamella 41 (drawing 9) of the upper row which adjoined the tray 3 and this which the lifter 111A (111B) chose are upper-\*(ed) to one, On the other hand, since the tray 3 and/or the tray mounting table 4 of the lower berth of the tray 3 which the depression lever 113A (113B) chose are pressed down caudad, the predetermined interval which the disk performance mechanism part 130 (drawing 14) faces by this can be formed.

[0090]Next, the tray selection and the disk grasping release part 120A of the separation mechanism section 90A which were shown in drawing 11 - drawing 13, In order to cancel grasping of the disk 2 grasped on the tray 3 previously explained using drawing 2, it provides so that grasping release of the disk grasping lever 9A side may be carried out among the disk grasping levers 9 (9A, 9B).

[0091]In drawing 11, the disk grasping release lever 121A by the side of the disk grasping release part 120A is supported by making into a fulcrum the axis 122 which adhered to the superior lamella 73, enabling free rotation.

Y character part 121a of an end part engages with the pin 94 which adhered to the connecting plate 93, and the notch section 73a of the superior lamella 73 is attended, and the drooping section 121b of the other end hangs caudad, and is formed.

And when the 2nd cam wheel 77 is located in an initial state. Since the connecting plate 93 which carried out the splice to the cam groove (not shown) by the side of a rear face is moving in the arrow Y<sub>1</sub> direction, the disk grasping release lever 121A rotates clockwise focusing on the axis 122, thereby, the drooping section 121b is in the state evacuated back, and insertion of the magazine 1 is permitted. On the other hand, as shown in drawing 13, when the connecting plate 93 moves in the arrow Y<sub>2</sub> direction, When the disk grasping release lever 121A rotates counterclockwise focusing on the axis 122, and the drooping section 121b projects from back to a near side and pushes the pressing part 9b (drawing 2) of the disk grasping lever 9A by this, grasping release of the disk 2 is carried out from the tray 3.

[0092]Next, as shown in drawing 14 (A) and (B), the disk performance mechanism part 130 by which rocking support was carried out is explained to the frame 71 of the cam wheel supporter 70.

[0093]The above-mentioned disk performance mechanism part 130 moves up and down to a tray laminating direction at up-and-down motion and one of the cam wheel supporter 70.

The disk playing section 140 which performs the disk 2, and the elastic-suspension part 150 which carries out the elastic suspension of the disk playing section 140 by the 1st

cam wheel 76, It can divide roughly into the rocking supporter 170 which makes the disk playing section 140 face in the predetermined interval of the lower part of the desired tray 3 by the 1st cam wheel 76.

[0094]In drawing 14 (A), among the above-mentioned members forming, unitization of the disk playing section 140 is carried out into the box 141, and it is assembled. Namely, the box 141 used as the pedestal of the disk playing section 140 is formed in case shape using dies casting material, a resin material, etc., and is attached, enabling free rotation of the turntable 143 which adhered to the inside 141a at the axis of the motor 142. The placing part 143b which formed protruding of the spindle part 143a which fits in is carried out to central hole 2b (drawing 2) of the disk 2 in the upper part, is connected with this turntable 143 with this spindle part 143a, and lays the playback side (or recording surface) 2c side of the disk 2 caudad is formed in disc-like. The three chucking claws 144 energized by elastic members (not shown), such as rubber, are formed to the peripheral part of the spindle part 143a, enabling a free attitude. Under the present circumstances, the spindle part 143a provided with the chucking claw 144, Chucking of the disk 2 can be certainly carried out to the turntable 143 from the upper part of the spindle part 143a, grasping the disk 2 on the tray 3 so that it may mention later, since formed protruding was carried out to the thickness grade of the disk 2 at the ultra-thin form, Chucking is possible also at the airtight structure in which the central hole is not drilled like [ in the case of the tray 3A of the highest rung ]. A very thin type disk chucking structure becomes the best for the disk automatic playing device 20 which adopted tray isolation construction.

[0095]The optical pickup 145 is attached to the playback side (or recording surface) 2c side of the disk 2 which carried out chucking to the turntable 143 inside [ 141a ] the box 141, enabling free movement to the diameter direction (arrow D<sub>1</sub>, the D<sub>2</sub> direction) of the disk 2. The above-mentioned optical pickup 145 is guided in one side at the guide rail 146, and is freely movable to the diameter direction of the disk 1 by making it screw in the threaded rod 148 which is slowed down from the motor 147 and rotates the side which separates an interval from this guide rail 146, and counters.

[0096]In accordance with the periphery of the box 141, as for the elastic-suspension part 150 which carries out the elastic suspension of the disk playing section 140, the 1st and 2nd three supporters 141b and 141c are formed.

These 1st and 2nd supporter 141b and 141c is allocated as a point of triangular shape, shifting a position mutually and taking weight balance into consideration.

Among these, formed protruding of the 1st supporter 141b is carried out to the

periphery lower part of the box 141, the rubber cushion 151 is inserted in these 1st supporter 141b, respectively, and the bottom of the rubber cushion 151 has adhered to the chassis 152 of the lower part of the box 141. On the other hand, formed protruding of the 2nd supporter 141c is carried out to the periphery intermediate height position of the box 141 as a triangular pyramid shape pivot.

The box support members 157-159 which carry out the following are removable.

[0097]As expanded and shown in drawing 14 (B), it is a lower part of 141 d of bottoms of the box 141, and two or more box support members 157-159 which collaborate with the slide member 153 and this slide member 153 are formed on the chassis 152. That is, it is shown to the slide member 153 to the guide grooves 153a and 153a at the guide pin 154, 154 which adhered to the chassis 152.

The slide member 153 is always energized in the arrow D<sub>2</sub> direction with the extension spring 155 hung on the chassis 152 and the slide member 153, and it bends from an end part to the right-angled upper part, and formed protruding of the piece 153a is carried out.

And the lever 160 for flow TIGU which carried out the splice to the 1st cam wheel 76 later mentioned to the above-mentioned piece 153a of bending has contacted.

[0098]The moved back of the box support members 157-159 is carried out to the axes 156A-156C which adhered to the chassis 152.

Among these, the box support member 157, 158 engages with the slide member 153, and the box support member 159 is engaging with the box support member 158.

It bends from each end part of the box support members 157-159 to the right-angled upper part, formed protruding of the pieces 157a-159a is carried out, and round hole 157a<sub>1</sub> - 159a<sub>1</sub> are formed in these pieces 157a-159a of bending. These round hole 157a<sub>1</sub> - 159a<sub>1</sub> come to attach and detach to the pivot formed in the 2nd supporter 141c of the box 141.

[0099]Avoiding here the pieces 153a, 157a-159a of bending formed in each from the upper part of the slide member 153 and the box support members 157-159. The box 141 holding the disk playing section 140 is made to support on the chassis 152 via two or more rubber cushions 151, as shown in drawing 14 (A).

[0100]Next, on the chassis 152, the rocking supporter 170 is in the state which assembled the above-mentioned disk playing section 140 and the above-mentioned elastic-suspension part 150, and supports this chassis 152 between the bottom plate 72 of the cam wheel supporter 70, and the superior lamella 73, enabling free rocking. That is, as for the above-mentioned rocking supporter 170, the axis 171 has adhered to the

left edge part of the chassis 152.

The arm 173 energized by the torsion spring 172 is attached in this axis 171.

The both ends of the above-mentioned torsion spring 172 are hung on the piece 152a of bending formed in the chassis 152 so that the arm 173 might energize counterclockwise focusing on the axis 171. The function of the torsion spring 172 is energized so that the chassis 152 holding the disk playing section 140 and the elastic-suspension part 150 may be stored between the insides of the bottom plate 72 and the superior lamella 73. The lower end part of the axis 171 is supported by the bottom plate 72, enabling free rotation, and it is supported by the hole 73b which the upper bed part of the axis 171 drilled in the superior lamella 73, enabling free rotation.

[0101]On the other hand, the lever 160 for flow TIGU and the lever 174 for rocking which collaborate with the 1st cam wheel 76 are provided in the rear-face side of the superior lamella 73. The lever 160 for flow TIGU is supported among the above by the axis 161 which adhered to the rear-face side of the superior lamella 73, an end part carries out a splice to 76 d of cam grooves by the side of a rear face, and the pressing part 160a is formed in the other end through the axis 161. The lever 174 for rocking was supported by the axis 175 which adhered to the rear-face side of the superior lamella 73, the end part carried out the splice to the cam groove 76e by the side of a rear face, and the pin 176 has adhered to the other end through the axis 175. the two forks which formed this pin 176 in the downward arm 173 -- it is engaging with the \*\* engagement part 173a.

[0102]If the 1st cam wheel 76 rotates clockwise, here via the lever 174 for rocking which carried out the splice to the cam groove 76e, Since the arm 173 resists the torsion spring 172, it rotates clockwise focusing on the axis 171 and the disk playing section 140 and the elastic-suspension part 150 which were supported by the chassis 152 also rotate clockwise to the arm 173 and one, It projects from between the position 72f of the stored initial state which the disk performance mechanism part 130 showed to drawing 7, i.e., the R section, and 73f to the position shown in drawing 14 (A) at the time of a performance of the disk 2, and can enter promptly in the shortest move (rocking) distance in the tray 3 and the R section 3f of the tray mounting table 4, and 4f (drawing 2). This state is the same as the state which showed in drawing 8, and will be in the state where the disk performance mechanism part 130 faced in the predetermined interval of the lower part of the desired tray 3.

[0103]After it returned to drawing 14 (A) and the disk playing section 140 and the elastic-suspension part 150 have projected to the position of a graphic display, The 2nd supporter 141c formed in the box 141 of the disk playing section 140, Since it has fitted

into round hole 157a<sub>1</sub> formed in the pieces 157a-159 of bending of the box support members 157-159 · 159a<sub>1</sub> as illustrated to the two-dot chain line, the disk playing section 140 is in the state where it was firmly supported by the chassis 152. Then, if the 1st cam wheel 76 rotates further clockwise, the pressing part 160a of the lever 160 for flow TIGU which carried out the splice to 76 d of cam grooves will push the piece 153a of bending of the slide member 153 in the arrow D<sub>1</sub> direction, While this slide member 153 resists the extension spring 155, by moving in the arrow D<sub>1</sub> direction, two or more box support members 157-159 which collaborate with the slide member 153 rotate in the direction which bends focusing on the axes 156A-156C, and extends the pieces 157a-159a. Therefore, since round hole 157a<sub>1</sub> which was bent and was formed in the pieces 157a-159a · 159a<sub>1</sub> estrange from the 2nd supporter 141c of the box 141 like a graphic display, The box 141 will be in the state where it was supported by the rubber cushion 151, namely, floating of the disk playing section 140 was carried out by the rubber cushion 151 to the chassis 152 here. If the disk 2 which carried out chucking to the turntable 143 where [ this ] floating is carried out is played by the optical pickup 145 (or record), Since disturbance, such as vibration from the outside, is not added to the optical pickup 145 by operation of the rubber cushion 151, the disk 2 can be performed good.

[0104]{operation by the whole disk automatic playing device 20} -- here explains briefly operation by the whole disk automatic playing device 20 by the above-mentioned composition in order of operation.

[0105]Drawing 15 thru/or drawing 23 are the mimetic diagrams for explaining operation by the whole disk automatic playing device in order of operation, (A) is illustrated superficially and (B) is the front view seen from the path of insertion of a magazine. Drawing 24 is a timing chart of the main component of a disk automatic playing device.

[0106]On account of explanation, since it has already explained in full detail, it omits here, and each explanation of the members forming shown in drawing 15 thru/or drawing 23 of operation is explained below as that to which the magazine sliding plate 5 which constitutes the magazine 1 has reached the 3rd position state already shown in drawing 5 within the device 20. Please refer to it for the timing chart of the main component shown in drawing 24 timely according to explanation.

[0107]As shown in drawing 15 (A) and (B), the tray 3 which equipped with the disk 2 the magazine 1 inserted between the elastic magazine placing part superior lamella 41 and the magazine placing part bottom plate 42 is densely laminated by the tray mounting table 4. The disk 2 is grasped by the tray 3 by the grasping levers 9A and 9B. On the

other hand, since the switch lever 78 which carried out the splice to the cam groove of the 1st cam wheel 76 is in contact with switch SW<sub>4</sub>, the 1st and 2nd cam wheel 76 and 77 has stopped. In this state, the connecting plates 91, 93, 95, and 96 are carrying out the splice to the cam groove of the graphic display, respectively, and the connecting plates 91 and 93 of the method of the back move in the arrow Y<sub>1</sub> direction, and the connecting plates 95 and 96 on the left-hand side of this side are moving in arrow X<sub>2</sub> and the X<sub>1</sub> direction, respectively. The lifters 111A and 111B were located in the lowest, and the claw parts 111a and 111b, the depression levers 113A and 113B, and the disk grasping release levers 121A and 121B of the lifters 111A and 111B have evacuated from the tray 3. Although the graphic display is omitted, the disk performance mechanism part 130 also evacuates from the tray 3, and is stored under the superior lamella 73.

[0108]Next, as shown in drawing 16 (A) and (B), the 1st and 2nd cam wheel 76 and 77 has stopped in the state of drawing 15. If the lowest tray 3C is chosen by operation of the sliding plate 61, for example as drawing 11 explained, It enters into tray 3C and the upper tray 3B which the claw parts 111a and 111b of the lifters 111A and 111B chose, and the depression levers 113A and 113B enter into the tray mounting table 4.

[0109]Next, as shown in drawing 17 (A) and (B), with the command signal of a microcomputer (not shown) etc. Since the connecting plates 91 and 95 will move in arrow Y<sub>2</sub> and the X<sub>1</sub> direction if it rotates to a clockwise rotation and a counterclockwise rotation, respectively as the 1st and 2nd cam wheel 76 and 77 carried out the arrow, the lifters 111A and 111B go up. This moves up tray 3C, the upper trays 3B and 3A, and the elastic magazine placing part superior lamella 41 which the claw parts 111a and 111b chose. The tray mounting table 4 is pushed against the magazine placing part bottom plate 42 by the depression levers 113A and 113B. Therefore, the predetermined interval K is formed between the tray mounting table 4 and selected tray 3C.

[0110]Next, if the 1st and 2nd cam wheel 76 and 77 rotates to an arrow direction further as shown in drawing 18 (A) and (B), since the arm 173 rotates clockwise focusing on the axis 171 via the lever 174 for rocking which carried out the splice to the cam groove 76e (drawing 14) by the side of the rear face of the 1st cam wheel 76 -- the inside of the interval K predetermined [ above-mentioned ] in the disk performance mechanism part 130 -- and it faces in the tray 3 and the R section 3f of the tray mounting table 4, and 4f. Here, the box 141 of the disk playing section 140 is firmly supported by the chassis 152 (drawing 14) by the box support members 157-159.

[0111]Next, since the connecting plates 91 and 95 will move in arrow Y<sub>1</sub> and the X<sub>2</sub> direction slightly if the 1st and 2nd cam wheel 76 and 77 rotates to an arrow direction

further as shown in drawing 19 (A) and (B), the lifters 111A and 111B descend slightly. Here, chucking of the disk 2 with which selected tray 3C was equipped is carried out to the turntable 143 in the box 141. Under the present circumstances, since chucking of the disk 2 is carried out to the turntable 143 while it had been grasped by tray 3C, chucking operation can be performed certainly.

[0112]Next, since the connecting plates 93 and 96 will move in arrow  $Y_2$  and the  $X_2$  direction if the 1st and 2nd cam wheel 76 and 77 rotates to an arrow direction further as shown in drawing 20 (A) and (B), The disk grasping release levers 121A and 121B project to the tray 3C side, and press the grasping levers 9A and 9B. Here, grasping release of the disk 2 by which chucking was carried out to the turntable 143 is carried out from tray 3C.

[0113]Next, since the connecting plates 91 and 95 will move in arrow  $Y_2$  and the  $X_1$  direction slightly if the 1st and 2nd cam wheel 76 and 77 rotates to an arrow direction further as shown in drawing 21 (A) and (B), The lifters 111A and 111B go up slightly, and tray 3C from which the disk 2 was removed evacuates from the turntable 143. Therefore, the predetermined interval K is again formed between tray 3Cs from which chucking only of the disk 2 was carried out to the turntable 143, and the tray mounting table 4 and the disk 2 were removed.

[0114]Next, if the 1st and 2nd cam wheel 76 and 77 rotates to an arrow direction further as shown in drawing 22 (A) and (B), By the lever 160 (drawing 14) for flow TIGU which carried out the splice to 76 d (drawing 14) of cam grooves by the side of the rear face of the 1st cam wheel 76. Since round hole 157a<sub>1</sub> of the box support members 157-159 - 159a<sub>1</sub> estrange from the 2nd supporter 141c of the box 141, the box 141 is supported by the rubber cushion 151 (drawing 14), and will be in the state where floating of the disk playing section 140 was carried out here.

[0115]Next, since the switch lever 78 contacts switch SW<sub>5</sub> as shown in drawing 23 (A) and (B), rotation of the 1st and 2nd cam wheel 76 and 77 stops. Then, the disk 2 by which chucking was carried out to the turntable 143 by floating is rotated, and it is playing by moving the optical pickup 145 to the diameter direction of the disk 2 (or record).

[0116]As shown in drawing 23 (C), in the case where the tray 3B of the middle is chosen, the predetermined interval K which the disk performance mechanism part 130 is made to face is formed between the tray 3A of the highest rung, and tray 3C of the bottom. Under the present circumstances, if the predetermined interval K is based on the magazine placing part bottom plate 42, it will be formed above height  $H_2$  and will become high by the thickness of the tray 3 from height  $H_1$  in the case of drawing 23 (B).

On the other hand, as mentioned above, the cam wheel supporter 70 and one which move up and down to a tray laminating direction gradually are faced the disk performance mechanism part 130 corresponding to the height position of the predetermined interval K.

[0117]What is necessary is just to perform operation which returns the separated tray 3 to the original dense laminating condition by the above-mentioned reverse order, and explanation is omitted. Even when it chooses except tray 3C of the bottom, it becomes the almost same operation as the above, and explanation is omitted.

[0118]The desired tray 3 is chosen among the trays 3 densely laminated above by the operation 4 to drawing 15 - drawing 23, i.e., the tray mounting table in the magazine 1, Divide a desired tray into a tray laminating direction so that the predetermined interval K of the tray 3 of this request caudad may be maintained, and. The tray 3 of a request of the disk performance mechanism part 130 by which rocking support was carried out makes it face caudad, Chucking only of the disk 2 with which the desired tray 3 was equipped is carried out on the turntable 143, Since it is based on each cam groove which mainly formed operation until it performs by the optical pickup 145 in the 1st and 2nd cam wheel 76 and 77, such functional operation can be performed certainly continuously and it can contribute to the reliability and quality of the device 20 dramatically. Since a well-known switch, a circuit component, etc. are not needed so much by having used the 1st and 2nd cam wheel 76 and 77, the cost reduction of the device 20 also becomes possible.

[0119]As explained in full detail above, in the above-mentioned disk automatic playing device 20. When a user inserts the maca gin 1 in the device 20, have an advantage which can perform to pleasure the disk 2 which could choose and separate the desired tray 3 at random in the predetermined mounting position, and with which the desired tray 3 was equipped, and. It becomes unnecessary to provide the performance place of a disk like before independently in the device 20, the occupation area by the side of the device 20 can be set up small, and it can contribute to the miniaturization of the device 20. Therefore, it also becomes possible to apply the above-mentioned disk automatic playing device 20 as a disk automatic playing device for small mount which adopted for example, the DIN standard.

[0120]

[Effect of the Invention]In [ according to the disk automatic playing device concerning this invention explained in full detail above ] the Claim 1 description, Equip a tray with a disk, use this tray as a tray mounting table with plural laminates densely, and. Since the disk storage magazine which carried out framework formation was used for the



state which can carry two or more trays and tray mounting tables, in the predetermined mounting position in a device. A desired tray can be divided into a tray laminating direction so that a predetermined interval may be maintained between the tray or tray mounting table which chooses a desired tray from the tray laminated densely, and adjoins a desired tray and a desired tray, and a disk playing section can be made to face in this predetermined interval. As a result, when a user inserts a disk storage magazine in a device, have an advantage which can perform to pleasure the disk which could choose and separate the desired tray at random in the predetermined mounting position, and with which the desired tray was equipped, and. It becomes unnecessary to provide the performance place of a disk like before independently in a device, the occupation area by the side of a device can be set up small, and it can contribute to the miniaturization of a device. Therefore, it also becomes possible to apply the above-mentioned disk automatic playing device as a disk automatic playing device for small mount which adopted for example, the DIN standard. Tray selection and a separation mechanism section provided with the function to divide a desired tray into a tray laminating direction so that a desired tray may be chosen among the trays laminated densely and the tray of this request may maintain a predetermined interval etc., Since operation with the disk performance mechanism part which makes a disk playing section face in a predetermined interval is mainly based on rotation of a cam wheel (the 1st and 2nd cam wheel), such functional operation can be performed certainly continuously and it can contribute to the improvement in reliability and upgrading of a device dramatically. the cam wheel (the 1st and 2nd cam wheel) was used -- a sake -- well-known -- since neither a switch nor a circuit component is needed so much, the cost reduction of a device also becomes possible. It accompanies with a device, and since the disk storage magazine applied to this device can also be formed in a super-thin type, the portable performance of a disk storage magazine becomes good.

[0121]In the Claim 2 description, have the effect according to claim 1, and. a disk being grasped by a disk grasping lever on a tray, and it being equipped, and, When a turntable is equipped with a chucking claw and only a disk is laid in a turntable from the tray of the separated request, Since grasping release of the disk grasped on the desired tray is carried out after chucking of the disk is carried out to a turntable via a chucking claw, chucking of the disk can be certainly carried out to a turntable, and it can contribute to the improvement in reliability and upgrading of a device dramatically. Since disk chucking structure can be formed in an ultra-thin form, it becomes the best for the disk automatic playing device which adopted tray isolation construction. Since it is lost that a disk separates from a tray during tray separation, the reliability and

quality of a device can be improved like the above.

[0122]in the Claim 3 description, it had the Claim 1 description and the effect according to claim 2, and the switch which detects the laminating order of a tray was formed -- a sake -- a request -- the operation which chooses and separates a tray becomes more certain.

[0123]In the Claim 4 description, since it had the Claim 1 description, the Claim 2 description, and the effect according to claim 3 and unitization of each mechanism part was carried out, the assembly workability of a device improves remarkably, and correspondence at the time of service can also be performed promptly.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a perspective view showing the appearance of the disk storage magazine applied to the disk automatic playing device concerning this invention.

[Drawing 2]It is an exploded perspective view decomposing and showing the members forming of a disk storage magazine.

[Drawing 3]It is a figure for explaining the using form of a disk storage magazine.

[Drawing 4]It is a figure for explaining the using form of a disk storage magazine.

[Drawing 5]It is a figure for explaining the using form of a disk storage magazine.

[Drawing 6]It is a figure for explaining the using form of a disk storage magazine.

[Drawing 7]It is a perspective view in which having shown the entire configuration of the disk automatic playing device concerning this invention, and showing an initial state.

[Drawing 8]the state where the tray was separated within the disk automatic playing device was shown -- it is a fracture perspective view in part.

[Drawing 9]It is a figure expanding and showing a magazine placement mechanism part.

[Drawing 10]It is a perspective view developing and showing a part of inside of a disk automatic playing device.

[Drawing 11]It is a figure for explaining tray selection and the separation mechanism section of a cam wheel supporter.

[Drawing 12]It is a figure for explaining tray selection and the separation mechanism section of a cam wheel supporter.

[Drawing 13]It is a figure for explaining tray selection and the separation mechanism section of a cam wheel supporter.

[Drawing 14]It is a figure for explaining the disk performance mechanism part in a cam wheel supporter.

[Drawing 15]It is a mimetic diagram for explaining operation by the whole disk automatic playing device in order of operation.

[Drawing 16]It is a mimetic diagram for explaining operation by the whole disk automatic playing device in order of operation.

[Drawing 17]It is a mimetic diagram for explaining operation by the whole disk automatic playing device in order of operation.

[Drawing 18]It is a mimetic diagram for explaining operation by the whole disk automatic playing device in order of operation.

[Drawing 19]It is a mimetic diagram for explaining operation by the whole disk automatic playing device in order of operation.

[Drawing 20]It is a mimetic diagram for explaining operation by the whole disk automatic playing device in order of operation.

[Drawing 21]It is a mimetic diagram for explaining operation by the whole disk automatic playing device in order of operation.

[Drawing 22]It is a mimetic diagram for explaining operation by the whole disk automatic playing device in order of operation.

[Drawing 23]It is a mimetic diagram for explaining operation by the whole disk automatic playing device in order of operation.

[Drawing 24]It is a timing chart of the main component of a disk automatic playing device.

[Drawing 25]It is a perspective view for explaining the conventional disk automatic playing device.

[Description of Notations]

1 -- A disk storage magazine (magazine), 2 -- A disk, 2b -- Central hole, 3 (3A - 3C) -- A tray, 4 -- A tray mounting table, 9 (9A, 9B) -- Disk grasping lever, 20 -- A disk automatic playing device (device), 21 -- A frame, 30 -- Arm (2 crotch-like arm), 40 -- A magazine placement mechanism part, 60 -- A sliding mechanism section, 61 -- Sliding plate, 61b<sub>4</sub>, 61c<sub>2</sub>, 61c<sub>3</sub> -- Stair-like cam (stair-like cam groove), 61b<sub>3</sub> -- A Yamagata-like cam (Yamagata-like cam groove), 70 -- Cam wheel supporter, 76, 77 -- A cam wheel (the 1st and 2nd cam wheel), 90 (90A, 90B) -- Tray selection and a separation mechanism section, 100A, 100B -- A lifter part, 111A, 111B -- Lifter, 113A, 113B -- A depression lever, 120A, 120B -- Disk grasping release part, 121A, 121B -- A disk grasping release lever, 130 -- Disk performance mechanism part, 140 [ -- A placing part, 144 / -- A

chucking claw, 145 / -- An optical pickup, K / -- A predetermined interval, SW<sub>3</sub> / --  
Switch. ] -- A disk playing section, 143 -- A turntable, 143a -- A spindle part, 143b